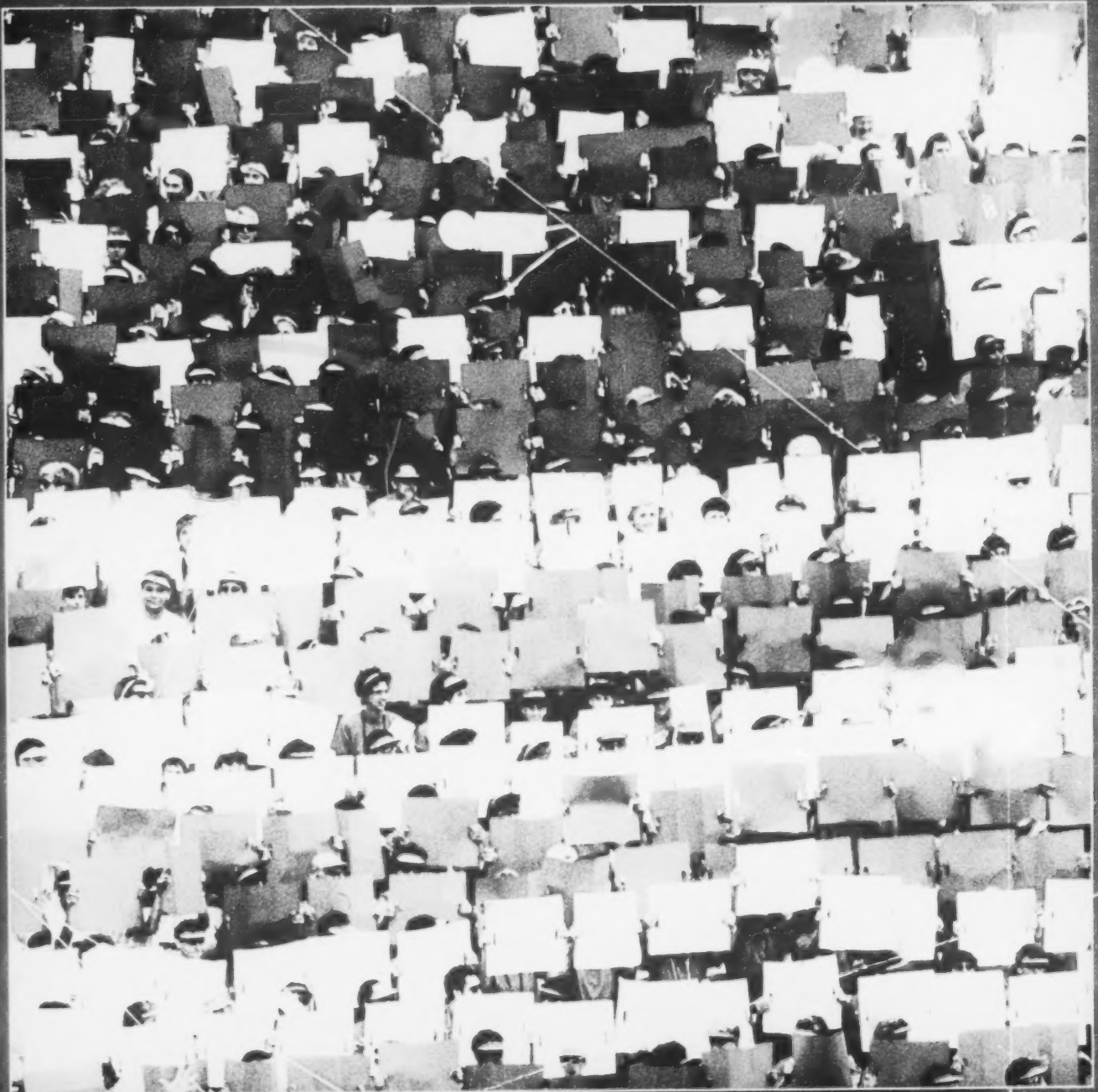


Family Planning

Perspectives

**Barriers to Prenatal Care
Funding Restrictions on Fetal Research**

U.S. Contraceptive Practices, 1982-1988



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Please see brief summary of
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on next page

LOESTRIN, 21
(Norethindrone Acetate and Ethinyl Estradiol Tablets, USP)

LOESTRIN, Fe
(Norethindrone Acetate and Ethinyl Estradiol Tablets, USP and Ferrous Fumarate Tablets, USP)

Before prescribing, please see full prescribing information. A brief summary follows:

INDICATIONS AND USAGE: Loestrin 21 and Loestrin Fe are indicated for the prevention of pregnancy in women who elect to use oral contraceptives (OCs) as a method of contraception. **Dose-Related Risk of Thromboembolism from Oral Contraceptives:** Two studies have shown a positive association between the dose of estrogen in oral contraceptives and the risk of thromboembolism. For this reason, it is prudent and in keeping with good principles of therapeutics to minimize exposure to estrogen. The OC product prescribed for any given patient should be that product which contains the least amount of estrogen that is compatible with an acceptable pregnancy rate and patient acceptance. It is recommended that new acceptors of OCs be started on preparations containing 0.05 mg or less of estrogen. **CONTRAINDICATIONS:** OCs should not be used in women with any of the following conditions: 1. Thrombophlebitis or thromboembolic disorders; 2. A past history of deep vein thrombophlebitis or thromboembolic disorders; 3. Cerebral vascular or coronary artery disease; 4. Known or suspected carcinoma of the breast; 5. Known or suspected estrogen-dependent neoplasia; 6. Undiagnosed abnormal genital bleeding; 7. Known or suspected pregnancy (see Warning No. 5); 8. Benign or malignant liver tumor which developed during the use of oral contraceptives or other estrogen-containing products.

WARNINGS

Cigarette smoking increases the risk of serious cardiovascular side effects from oral contraceptive use. This risk increases with age and with heavy smoking (15 or more cigarettes per day) and is quite marked in women over 35 years of age. Women who use oral contraceptives should be strongly advised not to smoke.

The use of oral contraceptives is associated with increased risk of several serious conditions including thromboembolism, stroke, myocardial infarction, hepatic adenoma, gallbladder disease, and hypertension. Practitioners prescribing oral contraceptives should be familiar with the following information relating to these risks.

1. **Thromboembolic Disorders and Other Vascular Problems.** An increased risk of thromboembolic and thrombotic disease associated with the use of OCs is well established. Three principal studies in Great Britain and three in the United States have demonstrated an increased risk of fatal and nonfatal venous thromboembolism and stroke, both hemorrhagic and thrombotic. These studies estimate that users of OCs are 4 to 11 times more likely than nonusers to develop these diseases without evident cause. **Cerebrovascular Disorders.** In a collaborative American study of cerebrovascular disorders in women with and without predisposing causes, it was estimated that the risk of hemorrhagic stroke was 2.0 times greater in users than in nonusers and the risk of thrombotic stroke was 4 to 9.5 times greater in users than in nonusers. **Myocardial Infarction.** An increased risk of myocardial infarction associated with the use of OCs has been reported, confirming a previously suspected association. These studies, conducted in the United Kingdom, found, as expected, that the greater the number of underlying risk factors for coronary artery disease (cigarette smoking, hypertension, hypercholesterolemia, obesity, diabetes, history of premyocardial infarction, the higher the risk of developing myocardial infarction, regardless of whether the patient was an OC user or not. OCs, however, were found to be a clear additional risk factor. In terms of relative risk, it has been estimated that OC users who do not smoke (smoking is considered a major predisposing condition to myocardial infarction) are about twice as likely to have a fatal myocardial infarction as nonusers who do not smoke. OC users who are also smokers have about a 5-fold increased risk of fatal myocardial infarction compared to users who do not smoke, but about a 10- to 12-fold increased risk compared to nonusers who do not smoke. Furthermore, the amount of smoking is also an important factor. In determining the importance of these relative risks, however, the baseline rates for various age groups must be given serious consideration. The importance of other predisposing conditions mentioned above in determining relative and absolute risks has not yet been quantified; it is quite likely that the same synergistic action exists, but perhaps to a lesser extent. **Risk of Dose:** In an analysis of data derived from several national adverse reaction reporting systems, British investigators concluded that the risk of thromboembolism, including coronary thrombosis, is directly related to the dose of estrogen used in oral contraceptives. Preparations containing 100 mcg or more of estrogen were associated with a higher risk of thromboembolism than those containing 50 to 80 mcg of estrogen. Their analysis did suggest, however, that the quantity of estrogen may not be the sole factor involved. This finding has been confirmed in the United States. Careful epidemiological studies to determine the degree of thromboembolic risk associated with progestogen only OCs have not been performed. Cases of thromboembolic disease have been reported in women using these products, and they should not be presumed to be free of excess risk. **Persistence of Risk:** In confirmation of earlier reports, two studies have suggested that an increased risk may persist for as long as 6 years after discontinuation of oral contraceptive use for cerebrovascular disease and 9 years for myocardial infarction. In addition, a prospective study suggested the persistence of risk for subarachnoid hemorrhage. **Estimate of Excess Mortality from Circulatory Diseases:** A large prospective study carried out in the U.K. estimated the mortality rate per 100,000 women per year from diseases of the circulatory system for users and nonusers of OCs according to age, smoking habits, and duration of use. The overall excess death rate annually from circulatory diseases for OC users was estimated to be 20 per 100,000 (ages 15 to 34—5700/00; ages 35 to 44—3300/00; ages 45 to 49—1400/00/00), the risk being concentrated in older women, in those with a long duration of use, and in cigarette smokers. It was not possible, however, to examine the interrelationships of age, smoking, and duration of use, nor to compare the effects of continuous versus intermittent use. Although the study showed a 10-fold increase in death due to circulatory diseases in users for 5 or more years, all of these deaths occurred in women 35 or older. Until larger numbers of women under 35 with continuous use of OCs for 5 or more years are available, it is not possible to assess the magnitude of the relative risk for this younger age group. The available data from a variety of sources have been analyzed to estimate the risk of death associated with various methods of contraception. The estimates of risk of death for each method include the combined risk of the contraceptive method (e.g., thromboembolic and thrombotic disease in the case of oral contraceptives) plus the risk attributable to pregnancy or abortion in the event of method failure. This latter risk varies with the effectiveness of the contraceptive method. The study concluded that the mortality associated with all methods of birth control is low and below that associated with childbirth, with the exception of OCs in women over 40 who smoke. (The rates given for pill only smokers for each age group are for smokers as a class. For "heavy" smokers [more than 15 cigarettes a day] the rates given would be about double, for "light" smokers [less than 15 cigarettes a day] about 50 percent.) The lowest mortality is associated with the condom or diaphragm backed up by early abortion. The risk of thromboembolic and thrombotic disease associated with OCs increases with age after approximately age 30 and, for myocardial infarction, is further increased by hypertension, hypercholesterolemia, obesity, diabetes, or history of premyocardial infarction and especially by cigarette smoking. The physician and the patient should be alert to the earliest manifestations of thromboembolic and thrombotic disorders (e.g., thrombophlebitis, pulmonary embolism, cerebrovascular insufficiency, coronary occlusion, retinal thrombosis, and mesenteric thrombosis). Should any of these occur or be suspected, the drug should be discontinued immediately. A low but not negligible increased risk of postoperative thromboembolic complications has been reported in OC users. If feasible, OCs should be discontinued at least 4 weeks before surgery of a type associated with an increased risk of thromboembolism or prolonged immobilization. 2. **Ocular Lesions.** There have been reports of neuro-ocular lesions, such as optic neuritis or retinal thrombosis, associated with the use of OCs. Discontinue OC medication if there is unexplained, sudden or gradual, partial or complete loss of vision; onset of proptosis or diplopia; papilledema; or retinal vascular lesions, and institute appropriate diagnostic and therapeutic measures. 3. **Carcinoma.** Long-term continuous administration of either natural or synthetic estrogen in certain animal species increases the frequency of carcinoma of the breast, cervix, vagina, and liver. Certain synthetic progestogens, none currently contained in OCs, have been noted to increase the incidence of mammary nodules, benign and malignant, in dogs. In humans, three case control studies have reported an increased risk of endometrial carcinoma associated with the prolonged use of exogenous estrogen in postmenopausal women. One publication reported on the first 21 cases submitted by physicians to a registry of cases of adenocarcinoma of the endometrium in women under 40 on OCs. Of the cases found in women without predisposing risk factors for adenocarcinoma of the endometrium (e.g., irregular bleeding at the time OCs were first given, polypoid ovaries), nearly all occurred in women who had used a sequential OC. These products are no longer marketed. No evidence has been reported suggesting an increased risk of endometrial cancer in users of conventional combination or progestogen only OCs. Several studies have found no increase in breast cancer in women taking OCs or estrogens. One study, however, while also noting no overall increased risk of breast cancer in women treated with OCs, found an excess risk in the subgroups of OC users with documented benign breast disease. A reduced occurrence of benign breast tumors in users of OCs has been well documented. In summary, there is at present no confirmed evidence from human studies of an increased risk of cancer associated with OCs. Close clinical surveillance of all women taking OCs is, nevertheless, essential. In all cases of undiagnosed persistent or recurrent abnormal vaginal bleeding, appropriate diagnostic measures should be taken to rule out malignancy. Women with a strong family history of breast cancer or who have breast nodules, fibrocystic disease, or abnormal mammograms should be monitored with particular care if they elect to use OCs instead of other methods of contraception. 4. **Hepatic Tumors.** Benign hepatic adenomas have been found to be associated with the use of OCs. One study showed that OC formulations with high hormonal potency were associated with a higher risk than lower potency formulations. Although benign, hepatic adenomas may rupture and may cause death through intra-abdominal hemorrhage. This has been reported in short-term as well as long-term users of OCs. Two studies relate risk with duration of use of the contraceptive, the risk being much greater after 4 or more years of OC use. While hepatic adenoma is a rare lesion, it should be considered in women presenting abdominal pain and tenderness, abdominal mass or shock. A few cases of hepatocellular carcinoma have been reported in women taking oral contraceptives. The relationship of these drugs to this type of malignancy is not known at this time. 5. **Use in or Immediately Preceding Pregnancy, Birth Defects in Offspring, and Malignancy in Female Offspring.** The use of female sex hormones—both estrogenic and progestational agents—during early pregnancy may seriously damage the offspring. It has been shown that females exposed in utero to diethylstilbestrol, a nonsteroidal estrogen, have an increased risk of developing in later life a form of vaginal or cervical cancer that is ordinarily extremely rare. This risk has been estimated to be of the order of 1 in 1,000 exposures or less. Although there is no evidence at the present time that OCs further enhance the risk of developing this type of malignancy, such patients should be monitored with particular care if they elect to use OCs instead of other methods of contraception. Furthermore, a high percentage of such exposed women (from 30% to 90%) have been found to have epithelial changes of the vagina and cervix. Although these changes are histologically benign, it is not known whether this condition is a precursor of vaginal malignancy. Male children so exposed may develop abnormalities of the urogenital tract. Although similar data are not available with the

use of other estrogens, it cannot be presumed that they would not induce similar changes. An increased risk of congenital anomalies, including heart defects and limb defects, has been reported with the use of sex hormones, including OCs, in pregnancy. One case control study has estimated a 4.7-fold increase in risk of limb-reduction defects in infants exposed in utero to sex hormones (OCs, hormonal withdrawal tests for pregnancy or attempted treatment for threatened abortion). Some of these exposures were very short and involved only a few days of treatment. The data suggest that the risk of limb reduction defects in exposed fetuses is somewhat less than 1 in 1,000 live births. In the past, female sex hormones have been used during pregnancy in an attempt to treat threatened or habitual abortion. There is considerable evidence that estrogens are ineffective for these indications, and there is no evidence from well-controlled studies that progestogens are effective for these uses. There is some evidence that triploidy and possibly other types of polyplody are increased among abortuses from women who become pregnant soon after ceasing OCs. Embryos with these anomalies are virtually always aborted spontaneously. Whether there is an overall increase in spontaneous abortion of pregnancies conceived soon after stopping OCs is unknown. It is recommended that for any patient who has missed two consecutive periods, pregnancy should be ruled out before continuing the contraceptive regimen. If the patient has not adhered to the prescribed schedule, the possibility of pregnancy should be considered at the time of the first missed period, and further use of OCs should be withheld until pregnancy has been ruled out. If pregnancy is confirmed, the patient should be apprised of the potential risks to the fetus and the advisability of continuation of the pregnancy should be discussed in the light of these risks. It is also recommended that women who discontinue oral contraceptives with the intent of becoming pregnant use an alternate form of contraception for a period of time before attempting to conceive. Many clinicians recommend 3 months although no precise information is available on which to base this recommendation. The administration of progestogen only or progestogen-estrogen combinations to induce withdrawal bleeding should not be used as a test of pregnancy. 6. **Gallbladder Disease.** Studies report an increased risk of surgically confirmed gallbladder disease in users of OCs and estrogens. In one study, an increased risk appeared after 2 years of use and doubled after 4 or 5 years of use. In one of the other studies, an increased risk was apparent between 6 and 12 months of use. 7. **Carbohydrate and Lipid Metabolism.** A decrease in glucose tolerance has been observed in a significant percentage of patients on OCs. For this reason, prediabetic and diabetic patients should be carefully observed while receiving OCs. An increase in triglycerides and total phospholipids has been observed in patients receiving OCs. The clinical significance of this finding remains to be defined. 8. **Elevated Blood Pressure.** An increase in blood pressure has been reported in patients receiving OCs. In some women, hypertension may occur within a few months of beginning OC use. In the first year of use, the prevalence of women with hypertension is low in users and may be no higher than that of a comparable group of nonusers. The prevalence in users increases, however, with longer exposure, and in the fifth year of use is two and a half to three times the reported prevalence in the first year. Age is also strongly correlated with the development of hypertension in OC users. Women who previously have had hypertension during pregnancy may be more likely to develop elevation of blood pressure when given OCs. Hypertension that develops as a result of taking OCs usually returns to normal after discontinuing the drug. 9. **Headache.** The onset or exacerbation of migraine or development of headache of a new pattern which is recurrent, persistent, or severe, requires discontinuation of OCs and evaluation of the cause. 10. **Bleeding Irregularities.** Breakthrough bleeding, spotting and amenorrhea are frequent reasons for patients discontinuing OCs. In breakthrough bleeding, as in all cases of irregular bleeding from the vagina, nonfunctional causes should be borne in mind. In undiagnosed persistent or recurrent abnormal bleeding from the vagina, adequate diagnostic measures are indicated to rule out pregnancy or other pathology. If pathology has been excluded, or to change to another formulation may be the problem. Changing to an OC with a higher estrogen content, while potentially useful in minimizing menstrual irregularity, should be done only if necessary since this may increase the risk of thromboembolic disease. Women with a past history of oligomenorrhea or secondary amenorrhea or young women without regular cycles may have a tendency to remain anovulatory or to become amenorrheic after discontinuation of OCs. Women with these preexisting problems should be advised of this possibility and encouraged to use other contraceptive methods. Post-use anovulation, possibly prolonged, may also occur in women without previous irregularities. 11. **Ectopic Pregnancy.** Ectopic as well as intrauterine pregnancy may occur in contraceptive failures. However, in progestogen only OC failures, the ratio of ectopic to intrauterine pregnancies is higher than in women who are not receiving OCs, since drugs are more effective in preventing intrauterine than ectopic pregnancies. 12. **Breast Feeding.** OCs given in the postpartum period may interfere with lactation. There may be a decrease in the quantity and quality of the breast milk. Furthermore, a small fraction of the hormonal agents in OCs has been identified in the milk of mothers receiving these drugs. The effects, if any, on the breast-fed child have not been determined. If feasible, the use of OCs should be deferred until the infant has been weaned. **PRECAUTIONS: General:** 1. A complete medical and family history should be taken prior to the initiation of OCs. The pretreatment and periodic physical examinations should include special reference to blood pressure, breasts, abdomen and pelvic organs, including Papanicolaou smear and relevant laboratory tests. As a general rule, OCs should not be prescribed for longer than 1 year without another physical examination being performed. 2. Under the influence of estrogen-progestogen preparations preexisting uterine leiomyomata may increase in size. 3. Patients with a history of psychic depression should be carefully observed and the drug discontinued if depression recurs to a serious degree. Patients becoming significantly depressed while taking OCs should stop the medication and use an alternate method of contraception in an attempt to determine whether the symptom is drug related. 4. OCs may cause some degree of fluid retention. They should be prescribed with caution, and only with careful monitoring, in patients with conditions which might be aggravated by fluid retention, such as convulsive disorders, migraine syndrome, asthma, or cardiac or renal insufficiency. 5. Patients with a past history of jaundice during pregnancy have an increased risk of recurrence of jaundice while receiving OC therapy. If jaundice develops in any patient receiving such drugs, the medication should be discontinued. 6. Steroid hormones may be poorly metabolized in patients with impaired liver function and should be administered with caution in such patients. 7. OC users may have disturbances in normal triptophan metabolism which may result in a relative pyridoxine deficiency. The clinical significance of this is yet to be determined. 8. Serum folate levels may be depressed by OC therapy. Since the pregnant woman is predisposed to the development of folate deficiency, a relative deficiency of folate increases with increasing gestation. It is possible that if a woman becomes pregnant shortly after stopping OCs, she may have a greater chance of developing folate deficiency and complications attributed to this deficiency. 9. The pathologist should be advised of OC therapy when relevant specimens are submitted. 10. Certain endocrine and liver function tests and blood components may be affected by estrogen-containing OCs: a. increased subnormal prothrombin retention; b. increased prothrombin and factors VII, VIII, IX, and X, decreased antithrombin; c. increased norepinephrine-induced platelet aggregability; c. increased thyroid binding globulin (TBG) leading to increased circulating total thyroid hormone, as measured by protein-bound iodine (PBI), T4 by column, or T4 by radioimmunoassay. Free T4 resin uptake is decreased, reflecting the elevated TBG; free T4 concentration is unaltered; d. decreased premenstrual androgen excretion; e. reduced response to metyrapone test. **INFORMATION FOR THE PATIENT:** See Patient Labeling. **DRUG INTERACTIONS:** Reduced efficacy and increased incidence of breakthrough bleeding have been associated with concomitant use of rifampin. A similar association has been suggested with barbiturates, phenylbutazone, phenytoin sodium, tetracycline, and ampicillin. **CARCINOGENESIS, PREGNANCY, NURSING MOTHERS:** See Contraindications and Warnings sections. **ADVERSE REACTIONS:** An increased risk of the following serious adverse reactions has been associated with the use of OCs (see Warnings): Thrombophlebitis, pulmonary embolism, coronary thrombosis, cerebral thrombosis, cerebral hemorrhage, hypertension, gallbladder disease, benign hepatic adenoma, congenital anomalies. There is evidence of an association between the following conditions and the use of OCs, although additional confirmatory studies are needed: Mesenteric thrombosis, neuro-ocular lesions, e.g., retinal thrombosis and optic neuritis. The following adverse reactions have been reported in patients receiving OCs and are believed to be drug related: Nausea and vomiting, usually the most common adverse reactions, occur in approximately 10 percent or less of patients during the first cycle. Other reactions, as a general rule, are seen much less frequently or only occasionally. Gastrointestinal symptoms (such as abdominal cramps and bloating), breakthrough bleeding, spotting, change in menstrual flow, dysmenorrhea, amenorrhea during and after treatment, temporary infertility after discontinuance of treatment, edema, chloasma or melasma which may persist, breast changes: tenderness, enlargement and secretion; change in weight (increase or decrease); change in cervical erosion and cervical secretion; possible diminution in lactation when given immediately postpartum; cholestatic jaundice; migraine; increase in size of uterine leiomyomata; rash (allergic); mental depression; reduced tolerance to carbohydrates; vaginal candidiasis; change in corneal curvature (sleeping); intolerance to contact lenses. The following adverse reactions have been reported in users of OCs, and the association has been neither confirmed nor ruled out: Premenstrual-like syndrome; cataracts; changes in libido; chorea; changes in appetite; cystitis-like syndrome; headache; nervousness; dizziness; hirsutism; loss of scalp hair; erythema multiforme; erythema nodosum; hemorrhagic eruption; vaginitis; porphyria; hemolytic uremic syndrome. **ACUTE OVERDOSE:** Serious effects have been reported following acute ingestion of large doses of OCs by young children. Overdose may cause nausea, and withdrawal bleeding may occur in females. **HOW SUPPLIED:** Loestrin 21 is available in dispensers each containing 21 tablets. Each tablet contains 1 mg of norethindrone acetate and 20 mcg of ethinyl estradiol. Available in packages of five dispensers. Loestrin Fe 1/20 is available in dispensers each containing 21 white tablets and 7 brown tablets. Each white tablet contains 1 mg of norethindrone acetate and 20 mcg of ethinyl estradiol. Each brown tablet contains 75 mcg ferrous fumarate. Available in packages of five dispensers. Loestrin 21 1/30 is available in dispensers each containing 21 tablets. Each tablet contains 15 mcg of norethindrone acetate and 30 mcg of ethinyl estradiol. Available in packages of five dispensers. Loestrin Fe 1/30 is available in dispensers each containing 21 green tablets and 7 brown tablets. Each green tablet contains 15 mcg of norethindrone acetate and 30 mcg of ethinyl estradiol. Each brown tablet contains 75 mcg ferrous fumarate. Available in packages of five dispensers.

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UPDATE

HIV Rates Among U.S. Teenagers

Three out of every 10,000 teenagers who applied for military service in the United States between 1985 and 1989 tested positive for infection with the human immunodeficiency virus (HIV), including one in 1,000 black teenagers.¹ According to a study of serum samples from more than 1.1 million applicants who were tested, 393 teenagers (0.34 per 1,000) were seropositive. Infection rates were similar for females and for males (0.32 per 1,000 and 0.35 per 1,000, respectively), but varied substantially by geographic region and by race or ethnicity: For example, the infection rate was 1.00 per 1,000 among blacks but only 0.29 per 1,000 among Hispanics and 0.17 among non-Hispanic whites. Regionally, rates were highest among teenagers from Maryland and New York (0.90 and 0.72 per 1,000, respectively) and, specifically, among those from the District of Columbia (5.32 per 1,000), Brooklyn (2.36 per 1,000), Austin (2.29 per 1,000), Baltimore (2.19 per 1,000) and the Bronx (2.14 per 1,000). The researchers conclude that "although clinically overt disease due to HIV infection is relatively rare among [U.S.] teenagers, . . . subclinical HIV infections are not rare in this age-group."

1. D. S. Burke et al., "Human Immunodeficiency Virus Infections in Teenagers: Seroprevalence Among Applicants for U.S. Military Service," *Journal of the American Medical Association*, 263:2074, 1990.

Impact of Sexual Abuse

Teenage women who have been sexually abused are slightly more likely to have engaged in voluntary sexual intercourse than are those who have not been abused, according to a study of child-welfare clients.¹ The study of 177 young women ages 13-18 (half of them living in foster homes and half living at their family homes but receiving some sort of child protection

services) found that 43 percent said they had been sexually abused—47 percent of those in foster care and 39 percent of those at home. Sixteen percent said they had been forced by an adult to have intercourse, while larger proportions reported other types of sexual contact. On average, the first experience of sexual abuse occurred at age 10, but 37 percent said that the first such incident occurred earlier. At the time of the survey, 15 percent (24 percent of those at home and seven percent of those in a foster home) said they were still being abused. Forty-eight percent of the teenagers living at home and 33 percent of the foster children said they had also had voluntary sexual intercourse. When controls were introduced for various background variables, the investigators found that sexually abused teenagers were more likely than the others to have had voluntary intercourse as well, although the association was only marginally statistically significant.

1. D. F. Polit, C. M. White and T. D. Morton, "Child Sexual Abuse and Premarital Intercourse Among High-Risk Adolescents," *Journal of Adolescent Health Care*, 11:231, 1990.

Unrecognized Herpes Infection

The prevalence of infection with type 2 herpes simplex virus (HSV-2) may be far greater than is clinically recognized.¹ A serologic study of 776 randomly selected clients of a sexually transmitted disease clinic and 636 female college students revealed that 46 percent of the former and nine percent of the latter were seropositive for HSV-2, yet 66 percent and 71 percent, respectively, had neither a history nor any clinical signs of genital herpes infection. Women infected with type 1 herpes simplex (cold sores) were somewhat more likely than the others to have a "silent" HSV-2 infection. The researchers observe that "reliance on medical history, examination,

and culture of suspected genital lesions to document genital herpes fails to identify most women with HSV-2 infection."

1. L. A. Koutsky et al., "The Frequency of Unrecognized Type 2 Herpes Simplex Virus Infection Among Women: Implications for the Control of Genital Herpes," *Sexually Transmitted Diseases*, 17:90, 1990.

Ectopic Rate Continues to Climb

Some 88,000 women had an ectopic pregnancy in 1987, an increase of about 19 percent over the number estimated for 1986. According to the latest data from the Centers for Disease Control,¹ the rate of ectopic pregnancies in 1987 was 16.8 per 1,000 reported pregnancies, almost four times as high as the rate in 1970 (4.5 per 1,000). Similarly, the rate per 1,000 live births has climbed from 4.8 per 1,000 to 23.1 per 1,000 over the same period, and the rate per 1,000 women aged 15-44 has risen from 4.2 per 1,000 to 15.3 per 1,000. However, even as the incidence of ectopic pregnancy keeps rising, the mortality rate from ectopic pregnancy continues to decline: Thirty women died as a result of ectopic pregnancy in 1987, for a case fatality rate of 3.4 deaths per 10,000 ectopic pregnancies; this rate represents a 31 percent decline from the 1986 rate of 4.9 deaths per 10,000 and a 90 percent decline from the 1970 fatality rate of 35.5 per 1,000.

1. "Ectopic Pregnancy—United States, 1987," *Morbidity and Mortality Weekly Report*, 39:401, 1990.

Sonograms Avert False Abortions

The addition of ultrasound screening to the usual battery of diagnostic tests given to patients at abortion clinics could help eliminate abortion procedures among nonpregnant women and provide early detection of potentially dangerous ectopic pregnancies.¹ A review of pathology reports after first-trimester abortions among nearly 3,000 women at an upstate New

York facility in 1986 showed that 16 of these women most likely had not been pregnant. Thus, beginning in 1987, the clinic supplemented the usual bimanual pelvic examination and urine pregnancy test with sonography and a pregnancy test sensitive to serum human chorionic gonadotropin. In 1987 and 1988, pregnancy was confirmed by ultrasound for 6,510 of 6,689 abortion patients seen at the clinic, and these women had abortions performed. However, the remaining 179 women were asked to return one week for another examination; at the return visit, 155 proved not to be pregnant. Thirty-seven had had a positive urine pregnancy test, leading the researchers to note that if they had relied on that test alone, "the 37 false-positive patients would probably have had [an unnecessary] suction curettage." In addition, the extra testing detected asymptomatic ectopic pregnancies in 13 women; without sonography, these women might have undergone an unnecessary suction curettage and remained at risk of serious complications from the ectopic pregnancy.

1. S. G. Kaali, "Updated Screening Protocol for Abortion Services," *Obstetrics & Gynecology*, 76:136, 1990.

Successful UK Trial of RU 486

The abortion-inducing drug mifepristone (better known as RU 486) is as effective and acceptable among British women as it is among French users, according to the results of a recent multicenter study.¹ A total of 588 women who were seeking a first-trimester abortion at 13 hospitals in England and Scotland were given 600 mg of mifepristone orally, with most returning 48 hours later to receive a suppository containing the prostaglandin gemeprost. Ninety-four percent of the women had a complete abortion, and women in the 10th week of gestation were about as likely to experience a complete abortion (93 percent) as those in the seventh week (94 percent). Bleeding is a common side effect of mifepristone use: Nine percent of the women reported that they bled severely in the two days between taking the mifepristone and taking the prostaglandin, although 48 percent said they experienced either light spotting or no bleeding at all; more women experienced moderate or heavy bleeding after receiving the prostaglandin, but 39 percent still reported experiencing only light bleeding in the four hours after taking the prostaglandin. Ninety-three percent experienced little or no change in hemoglobin levels, although five women had a hemorrhage that re-

quired curettage and transfusion. The investigators conclude that "medically induced termination of pregnancy is a realistic alternative to surgery."

1. UK Multicentre Trial, "The Efficacy and Tolerance of Mifepristone and Prostaglandin in First Trimester Termination of Pregnancy," *British Journal of Obstetrics and Gynaecology*, 97:480, 1990.

Birthspacing and Prematurity

Short intervals between pregnancies appear to put women at no significantly increased risk of delivering prematurely.¹ About four percent of nearly 4,500 women who gave birth at a Boston hospital between August 1977 and March 1980 and who had had at least one previous term birth delivered prematurely during the study period. This percentage was highest among those who had become pregnant within three months of their last birth (eight percent) and lowest among those who had waited 19-24 months between pregnancies (two percent). However, when researchers controlled for the effects of a large number of background characteristics, they found that the risk of a premature birth was not significantly increased at any interval. An earlier study of the same sample had indicated that the length of time between pregnancies was strongly and inversely related to the risk of having an underweight baby.² Thus, the researchers comment, their findings "underscore the importance . . . of explicitly distinguishing between the two paths to low birth weight: prematurity and intrauterine growth retardation. Short interpregnancy intervals . . . more plausibly have their effects on factors related to the intrauterine growth of infants rather than [on] factors related to the spontaneous onset of premature labor."

1. J. M. Lang et al., "Interpregnancy Interval and Risk of Preterm Labor," *American Journal of Epidemiology*, 132:304, 1990.

2. E. Lieberman et al., "The Association of Interpregnancy Interval with Small for Gestational Age Births," *Obstetrics & Gynecology*, 74:1, 1989.

Noninvasive Genetic Testing

A simple blood sample may soon be all that is needed to determine if a pregnant woman's fetus has a genetic defect, according to results from a recent Australian study.¹ Investigators took blood from 12 women who were 8-12 weeks pregnant and were having chorionic villus sampling because of concern over the possibility of fetal abnormality. Then, using monoclonal antibodies, they searched each blood

sample for the presence of circulating embryonic cells. To determine whether the technique could yield enough cells for genetic testing to be conducted, the researchers then tested each sample for genetic material from the Y chromosome (thereby determining the sex of the fetus). In 11 of the 12 samples, the findings from the blood test regarding fetal sex matched those from chorionic villus sampling. Blood from one woman who was 34 weeks pregnant was also tested, and once again the procedure accurately predicted fetal sex. "It is possible to identify and isolate fetal trophoblast cells from a small volume of maternal peripheral blood in both early and late pregnancy," the investigators conclude, adding that the technique could be "an important advance over amniocentesis and chorionic villus sampling for the prenatal diagnosis of a wide range of inherited disorders."

1. U. W. Mueller et al., "Isolation of Fetal Trophoblast Cells from Peripheral Blood of Pregnant Women," *Lancet*, II:197, 1990.

Public Opinion on Abortion Shifts

Small but significant increases in support for prochoice positions on abortion have been observed in the recent results from two continuing public opinion polls. According to a Gallup poll conducted in April 1990, 31 percent of Americans said that abortion should be legal under any circumstance (an increase from 24 percent in 1988), while the proportion stating that abortion should be illegal under all circumstances fell from 17 percent to 12 percent.¹ In addition, a poll sponsored by the National Opinion Research Center and conducted in spring 1990 showed a significant increase in the proportion of respondents saying that they approve of abortion for any reason, from 36 percent in 1988 to 43 percent in 1990.² The proportions approving of abortion in cases of health endangerment (92 percent), rape (85 percent) and fetal defect (81 percent) remained high, while slightly fewer than half of respondents said they approved of abortion when the woman cannot afford another child (48 percent), when an unmarried woman is pregnant and does not want to marry (45 percent) and when a married woman is pregnant but wants no more children.

1. G. Gallup, Jr., and F. Newport, "Americans Shift Toward Pro-choice Position," *The Gallup Poll Monthly*, Apr. 1990, p. 2.

2. T. W. Smith, National Opinion Research Center, personal communication with S. K. Henshaw, The Alan Guttmacher Institute, Aug. 10, 1990.

Contraceptive Practice in the United States, 1982-1988

By William D. Mosher

Summary

Use of oral contraceptives by married women declined markedly between 1973 and 1982, but analysis of data from the 1988 National Survey of Family Growth shows that this decline stopped between 1982 and 1988. Reliance on female sterilization continued to increase, however, and it remained the leading method among currently married and formerly married women. Among women of all marital statuses, IUD use dropped by two-thirds between 1982 and 1988, from 2.2 million to 0.7 million women. As the proportion of less-educated, low-income, black and Hispanic contraceptive users choosing the IUD decreased, the proportion relying on female sterilization increased. Among college-educated white women, use of female sterilization did not increase; instead, pill use rose in this group. Condom use increased most sharply among teenagers and rose among never-married white and black women, but the pill was still the leading method by far in these groups, regardless of race. Among never-married black women, reliance on sterilization increased significantly between 1982 and 1988, with female sterilization becoming the second leading method. Use of the diaphragm declined sharply over the same period among never-married white women and

About 60 percent of the 57.9 million U.S. women who were 15-44 years of age in 1988 were currently practicing contraception; 24 percent of them relied on either female sterilization or vasectomy, while 37 percent used reversible methods.

among those who intended to have more children, as did use of periodic abstinence (rhythm and natural family planning) and foam.

Introduction

National fertility surveys conducted since 1955 in the United States have documented the introduction and diffusion of such contraceptive methods as the pill, the IUD and sterilization. An article in 1984 described the sharp decline in pill use among married women between 1973 and 1982 and the rise in use of female sterilization, which by 1982 had become the leading method among married couples.¹ That article also described patterns of contraceptive use by marital status, with the pill the leading method among never-married women in 1982. However, because the 1982 survey was the first in this series of surveys to collect data from women of all marital statuses, no trend data for all women could be presented until now.

The primary purposes of this article are to describe, for the first time, the trends in contraceptive use between 1982 and 1988 among U.S. women by race, ethnic origin (Hispanic vs. non-Hispanic), marital status, education, income and fertility intentions, and to speculate why these changes occurred. Because this is the first detailed description of these data, this article does not attempt to answer all possible questions about trends and differences; the speculative explanations should be considered hypotheses to be confirmed or refuted by careful multivariate analysis. We hope that their inclusion here will

stimulate others to investigate some of these trends and differences in greater detail.

Data Source and Methods

The primary source of data for this article is the fourth cycle of the National Survey of Family Growth (NSFG), which was conducted in 1988.* Comparisons are made to the first and third cycles of the NSFG, conducted in 1973 and 1982. In each cycle, data were collected by personal interviews with a representative sample of women 15-44 years of age. In 1973, women were eligible for the sample if they had ever been married; the only never-married women interviewed in 1973 were those who had children of their own living with them. In 1982 and 1988, however, all women aged 15-44 were interviewed, regardless of their marital status. In 1982, the survey covered women in the coterminous United States; in 1988, Alaska and Hawaii were also included. The number of women interviewed totalled 9,797 in 1973, 7,969 in 1982 and 8,450 in 1988.

Interviewing for Cycle IV was conducted between January and August 1988. The sample was obtained from households that had been interviewed for the National Health Interview Survey (another NCHS survey) between October 1985 and March 1987. Allowing for nonresponse to both the earlier survey and the NSFG, the response rate was about 79 percent, the same as in 1982. The sample design, weighting procedures, variance estimation and imputation procedures are described in detail in a forthcoming NCHS report.² Because the data are based on samples, they

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*The NSFG is conducted periodically by the National Center for Health Statistics to collect nationally representative data on factors related to childbearing, including contraception, sterilization, infertility and related aspects of maternal and infant health.

are subject to sampling variability. Differences discussed as increases or decreases in this article were tested and found to be statistically significant at the five percent level ($p < .05$) using a two-tailed z-test. In a few cases, differences that are significant at $p < .10$ are discussed; these are specifically noted in the text as being significant only at the 10-percent level.

The analyses in this article pertain to current contraceptive status, which is measured as of the week of the interview. This measure is based on a series of questions about each contraceptive method a woman has ever used since her last pregnancy (or since first intercourse, if she has never been pregnant). Her current contraceptive method is the one that she reports she is "still using." If she is using more than one method, she is classified as using the one that is most effective at preventing pregnancy.*

The contraceptive status measures derived from the 1982 and 1988 surveys are based on similar questions. However, the 1982 data on "contraceptive" and "non-contraceptive" sterilization have been reclassified to make them more comparable to the 1988 data. A sterilization operation is now classified as noncontraceptive if the woman reported that it was done solely or partly because of "medical problems with my female organs (such as infections, cancer, etc.);" all other operations are classified as contraceptive in its literal sense: to prevent pregnancy, regardless of why the woman wanted to prevent pregnancy.† Reclassifying the 1982 sterilization data in this way leaves them highly comparable to the 1988 data, although not perfectly so. As a test of the possibility that the difference in definition of sterilization could affect the results presented here, the data in the tables in this article were rerun using an alternative definition of sterilization that was independent of the "contraceptive intent" questions (with all tubal ligations replacing female contraceptive sterilizations and all vasectomies replacing male contraceptive sterilizations). The results were virtually identical to those reported in this article.‡

The only other recent national survey of contraceptive use was done in 1987³ and had a lower response rate than the 1988 NSFG (74 percent vs. 79 percent). It also had one noteworthy limitation compared to the NSFG: Its data were not weighted by race. The NSFG, in contrast, was weighted and adjusted by race, marital status and parity.⁴ Thus, we would expect the NSFG data to yield more accurate national estimates for black women. Other differences between that survey and the NSFG include the different data years (1987 vs. 1988) and differences in sample design, the method of data collection (mail vs. personal interview), the length and detail of the two questionnaires, and different procedures for classifying contraceptive status. Despite all of these differences, however, both surveys reveal similar overall trends: increases in the use of female sterilization, the pill and the condom and a decline in reliance on the IUD.

Contraceptive Status in 1988

There were 57.9 million U.S. women who were 15–44 years of age in 1988 (see Table 1); about 60 percent were currently practicing contraception—24 percent using contraceptive sterilization and 37 percent using other methods. The 40 percent not currently using contraceptives consisted of nine percent who were pregnant, postpartum or trying to become pregnant, six percent who were sterile for noncontraceptive (health) reasons, 12 percent who had never had intercourse, seven percent who had not had intercourse in the three months preceding the survey and seven percent who had had intercourse in the past three months.

Between 1982 and 1988, the proportion who had never had intercourse decreased from 14 percent to 12 percent. The proportion using contraceptive sterilization increased from 19 percent to 24 percent, while the percentage of U.S. women who were using nonsurgical methods of contraception was unchanged. Both of the above changes partly reflect differences in behavior and partly reflect the aging of the female reproductive-aged population. For

Table 1. Number and percentage distribution of women aged 15–44, by current reproductive status, United States, 1982 and 1988

Status	1982	1988
N (in 000s)	54,099	57,900
Using a method	55.7	60.3**
Contraceptive sterilization	19.0	23.6*
Nonsurgical methods	36.7	36.7
Not using a method	44.3	39.7
Pregnant, postpartum or seeking pregnancy	9.2	8.6
Noncontraceptively sterile	8.2	6.1
Never had intercourse	13.6	11.5*
Had not had intercourse in the last three months	5.9	6.9
Had had intercourse in the last three months	7.4	6.7
Total	100.0	100.0

*Change from 1982 to 1988 is significant at $p \leq .05$.

**Change from 1982 to 1988 is significant at $p \leq .01$.

Note: In this and subsequent tables, data are from the National Surveys of Family Growth, Cycles III (1982) and IV (1988). Data for 1982 have been recalculated so that the contraceptive sterilized are comparable to 1988 data. All percentages are weighted national estimates; columns may not add to 100 because of rounding.

example, the number of women aged 15–24 dropped by 1.5 million and the number aged 25–44 increased by nearly 5.4 million between 1982 and 1988.⁵ This change in age-composition is, of course, a result of the aging of the baby-boom cohorts (those born in 1946–1964 and thus aged 24–42 in 1988) and their replacement by the smaller baby-bust cohorts (those born in 1965–1973, and thus aged 15–23 in 1988). Differences and trends from 1982–1988 in the other categories shown in Table 1 (the proportions pregnant, postpartum, seeking pregnancy, noncontraceptively sterile and other groups of nonusers) are analyzed in another report.⁶

The percentage of U.S. teenagers practicing contraception rose significantly, from 24 percent in 1982 to 32 percent in 1988 (Table 2—page 200). Subsequent data will show that this trend reflects teenagers' increased use of the condom. The proportion practicing contraception also rose significantly among 35–39-year-olds (from 62 percent to 70 percent), but an apparent increase among 40–44-year-olds (from 61

*The priority order for classifying methods by effectiveness and the order in which they are listed in this article are: female sterilization, male sterilization, pill, IUD, diaphragm, condom, foam, rhythm, withdrawal, douche and other.

†The definition of contraceptive sterilization found on the 1982 NSFG Cycle III public-use data tape is not comparable to the definition on the 1988 data tape. In the 1982 public-use tape, 83 percent of tubal ligations were classified as contraceptive; in the reclassified 1982

data, 91 percent of tubal sterilizations were reported to be contraceptive in intent, compared with 97 percent of tubal sterilizations in the 1988 data. Researchers are advised to use the revised variable for future research using 1982 NSFG data. Users of the 1982 data tape who want to make their results comparable to those reported in this article may obtain specifications for the revised variable from the author.

‡When the tables presented in this article were rerun using the alternative definition of sterilization, the pro-

portions using female sterilization (and the proportions using all other methods) in almost all cases either were the same as those presented in the article or differed by only one percentage point; furthermore, increases in sterilization could be observed in the same subgroups of women, regardless of the definition of sterilization that was used, and the differentials and patterns of change remained the same as well. Thus, the data on sterilization given in this article appear to be robust, regardless of which definition of contraceptive sterilization is used.

Table 2. Percentage of women aged 15-44 who were currently using contraceptives, and percentage who were nonusers and had intercourse in the last three months, by selected characteristics, 1982 and 1988

Characteristic	Using contraceptives		Not using, had intercourse in past three months	
	1982	1988	1982	1988
Total	55.7	60.3	7.4	6.7
Age				
15-19	24.2	32.1*	9.9	7.6
20-24	55.8	59.0	8.2	8.1
25-29	65.9	64.5	7.1	7.5
30-34	67.6	68.0	5.8	5.4
35-39	61.9	70.2*	6.4	4.6
40-44	61.2	66.0	5.6	5.5
Race/ethnicity				
Hispanic	50.6	50.4	8.5	9.6
Non-Hispanic white	57.3	62.9**	6.2	5.5
Non-Hispanic black	51.6	56.8*	13.6	10.3*

*Change from 1982 to 1988 is significant at $p \leq .05$.**Change from 1982 to 1988 is significant at $p \leq .01$.

percent to 66 percent) fell short of statistical significance. These increases among women 35-44 reflect greater use of female sterilization, as has been shown in an earlier report.⁷ The percentage using contraceptives grew significantly among both non-Hispanic white and non-Hispanic black women, but not among Hispanic women.

The proportion of women who had had intercourse during the three months preceding the survey but were not using a method is sometimes viewed as a measure of the population at high risk of unintended pregnancy. There were no significant changes between 1982 and 1988 in the percentage of women in that category in any of the five-year age-groups shown in Table 2. The only significant change, seen in the second panel of the table, was for black women, among whom the proportion at high risk decreased from 14 percent in 1982 to 10 percent in 1988. Still, black women and Hispanic women were more likely than white women to be at high risk of unintended pregnancy in both 1982 and 1988. In 1988, for example, 10 percent of black women and of Hispanic women and six percent of white women were having intercourse but were not using a method.

Overall Trends in Method Use

About 34.9 million women were practicing contraception in 1988, compared with 30.1 million in 1982 (Table 3). The distribution of contraceptive users changed significantly in several ways between the two

years. Because two major IUD manufacturers withdrew their products from the U.S. market in 1985 and 1986,⁸ the number of women using the device fell by two-thirds, from 2.2 million in 1982 to 0.7 million in 1988, and the percentage of contraceptive users relying on the IUD dropped from seven percent to two percent. The next largest change between 1982 and 1988 was the rise in the use of female sterilization, from 23 percent to 31 percent of contraceptive users (significant at $p < .01$). There was also a significant drop in the proportion of women using the diaphragm (from eight percent to six percent), and a small but significant rise in use of the condom (from 12 percent to nearly 15 percent). Reliance on foam and on periodic abstinence both declined, although not significantly. The slight increase in the use of male sterilization (from 11 percent to 12 percent) also was not significant. The increase in use of the pill (from 28 percent to 31 percent) was only marginally significant ($p < .10$), although the number of women using the pill rose from 8.4 million in 1982 to 10.7 million in 1988.

•*Trends by marital status.* Among currently married women, trends since 1973 have been dramatic, given that the total fertility rate has changed little since then. In 1973, the leading method by far among married couples was the pill (36 percent); by 1988, the leading method was female sterilization (31 percent), followed by the pill (20 percent) and male sterilization (17 percent).

In 1973, about equal proportions of married contraceptive users were relying on female and male sterilization (12 percent and 11 percent, respectively). However, in subsequent years, use of female steriliza-

tion increased dramatically, and by 1988, 31 percent of those practicing contraception were using female sterilization, while only 17 percent were depending on male sterilization. From 1973 to 1982, the proportion of married contraceptive users relying on the pill dropped by half (from 36 percent to 19 percent), but this percentage did not change significantly between 1982 and 1988. The percentage of married contraceptive users depending on the diaphragm nearly doubled between 1973 and 1982 but did not change significantly between 1982 and 1988; use of the condom remained fairly stable among married couples over the years, while use of foam by married couples declined from five percent in 1973 to one percent in 1988. After a small rise between 1973 and 1982, use of periodic abstinence (both of calendar and temperature rhythm and of natural family planning) declined from five percent to three percent between 1982 and 1988.

Individual Method Use

Table 4 contains data on the percentage of contraceptive users relying on the six most popular methods, according to six independent variables. Three (age, marital status and intention to have more children) are indicators of life-cycle stage; the others (woman's education, ratio of household income to poverty level, and race/ethnicity) may be viewed as indicators of socioeconomic status. All have been shown in previous research to be strongly related to contraceptive choice.⁹ The race/ethnicity categories (Hispanic, non-Hispanic white and non-Hispanic black) are used here because most Hispanic women are classi-

Table 3. Percentage distribution and number (in 000s) of all contraceptive users aged 15-44 and of all currently married users, by current method, 1973-1988

Method	All users				Currently married users							
	1982		1988		1973		1982		1988			
	%	N	%	N	%	N	%	N	%	N	%	N
Sterilization	34.1	10,295	39.2	13,686	23.5	4,365	42.4	8,341	48.7	10,561		
Female	23.2	6,996	27.5*	9,614	12.3	2,289	26.9	5,290	31.4*	6,806		
Male	10.9	3,298	11.7	4,069	11.2	2,077	15.5	3,051	17.3	3,755		
Pill	28.0	8,431	30.7	10,734	36.1	6,695	19.3	3,794	20.4	4,409		
IUD	7.1	2,153	2.0**	703	9.6	1,781	6.9	1,357	2.0**	427		
Diaphragm	8.1	2,436	5.7*	2,000	3.4	636	6.5	1,279	6.2	1,335		
Condom	12.0	3,608	14.6*	5,093	13.5	2,501	14.1	2,767	14.3	3,103		
Foam	2.4	711	1.1	371	5.0	927	2.8	558	1.4	293		
Per. abst.	3.9	1,166	2.3	806	4.0	746	4.6	906	2.8	603		
Withdrawal	2.0	588	2.2	778	2.1	392	1.7	336	2.3	503		
Other†	2.5	754	2.1	76	2.7	504	1.7	328	1.9	423		
Total	100.0	30,142	100.0	34,912	100.0	18,548	100.0	19,667	100.0	21,657		

*Change from 1982 to 1988 is significant at $p \leq .05$.**Change from 1982 to 1988 is significant at $p \leq .01$.

†"Other" consists of douche, sponge, jelly or cream alone and other methods.

Table 4. Number of contraceptive users aged 15-44 and percentage of users who rely on various methods, by selected characteristics, 1982 and 1988

Characteristic	N (in 000s)		Female sterilization		Male sterilization		Pill		IUD		Diaphragm		Condom	
	1982	1988	1982	1988	1982	1988	1982	1988	1982	1988	1982	1988	1982	1988
Total	30,142	34,912	23	28*	11	12	28	31	7	2*	8	6*	12	15*
Age														
15-19	2,302	2,950	0	2	0	0	64	59	1	0	6	1*	21	33*
20-24	5,926	5,550	5	5	4	2	55	68**	4	0*	10	4*	11	15
25-29	6,762	6,967	14	17	6	6	35	45*	10	1**	12	6*	11	16*
30-34	6,339	7,437	31	33	15	14	16	22*	9	3**	8	9	12	12
35-39	4,889	6,726	42	45	18	20	6	5	8	3*	4	8*	12	12
40-44	3,924	5,282	45	51	23	22	1	3	6	4	4	4	11	11
Marital status														
Never married	6,757	8,826	4	6	2	2	53	59	5	1**	13	5**	12	20**
Currently married	19,667	21,657	27	31*	16	17	19	21	7	2**	7	6	14	14
Formerly married	3,718	4,429	39	51*	3	4	28	25	12	4*	7	5	2	6*
Education (in yrs.)†														
0-11	4,142	4,276	40	52*	8	7	22	23	12	4*	2	1	9	6
12	11,315	11,880	27	34**	14	15	28	29	6	2**	4	3	9	11
≥13	12,383	15,806	19	21	11	13	24	29*	8	2**	14	10*	14	16
Income (% of poverty level)														
0-149	6,886	7,238	26	37**	6	4	36	36	8	3*	6	2*	9	13*
150-299	9,524	8,812	25	32*	10	12	26	29	7	2**	7	5	12	14
≥300	13,733	18,862	21	22	14	14	26	30	7	2**	10	8	14	16
Fertility intentions														
More children	11,265	12,460	0	0	0	0	51	59*	6	1**	15	8**	15	22**
No more children	17,333	20,854	40	46*	19	19	13	13	7	3**	4	4	10	10
Race/ethnicity														
Hispanic	2,224	2,799	23	32	5	4	30	33	19	5**	5	2	7	14*
Non-Hispanic white	23,666	26,800	22	26*	13	14	26	30	6	2**	9	7*	13	15
Non-Hispanic black	3,520	4,208	30	38**	2	1	38	38	9	3**	3	2	6	10*

*Change from 1982 to 1988 is significant at $p \leq .05$.

**Change from 1982 to 1988 is significant at $p \leq .01$.

†Women aged 20-44 only.

fied by race as white, and Hispanic white women have strikingly different patterns of contraceptive use than other white women.¹⁰

As shown in Table 4, patterns of contraceptive choice vary markedly by the life-cycle and socioeconomic characteristics indicated. In 1988, for example, female sterilization was most commonly used by older women, by formerly married women, by the least-educated and lowest-income women, by those who intended to have no more children and by black and Hispanic women. Some of these differences were substantial: Fifty-two percent of contraceptive users with the least education were using female sterilization in 1988, compared with only 21 percent of the most-educated users.* Male sterilization was more commonly used by white women than by black women (14 percent vs. one percent). The pill was more commonly used by women under 25, by never-married women and by those who intended to have more children.

In 1982, the IUD was used most often by Hispanic women, by those with less edu-

cation and by formerly married women; the diaphragm, in contrast, was used by young, college-educated and never-married women who intended to have children in the future.¹¹ Those patterns were still visible in 1988, but less markedly so. In 1988, the condom was used primarily by teenagers, by never-married women and by those who intended to have children in the future.

•**Trends in sterilization.** As mentioned previously, the overall rise in the prevalence of female sterilization from 23 percent to 28 percent was significant at $p < .01$ (see Table 4).† None of the increases within five-year age-groups were significant, but there were increases in female sterilization in each of the four oldest age-groups (ages 25-44).

The age-standardized percentage using female sterilization in 1988 was also computed, using the 1982 population as the standard and the 1988 age-specific percentages. The unstandardized proportion of women using sterilization in 1988 was 27.5 percent, compared with 23.2 percent in 1982—an increase of 4.3 percentage points.

After standardization, the increase over time was 2.4 percentage points, to 25.6 percent. The latter increase is marginally statistically significant ($p < .10$). This suggests that 1.9 percentage points of the 4.3 percentage-point increase in sterilization was the result of the changing age-composition of the population of women of reproductive age and that the remaining 2.4 percentage points of increase was the result of an increase in the age-specific percentages of women sterilized. Thus, both the aging of the baby-boom cohort and an increase in the popularity of female sterilization appear to have contributed to the overall increase in the proportion of women using female sterilization.

The increases in the percentages of currently married and formerly married women using female sterilization were significant, and were particularly striking among formerly married women (from 39

*This differential is unaffected when it is standardized for age.

†Significance tests were done on unrounded percentages.

Table 5. Percentage distribution of non-Hispanic white and non-Hispanic black contraceptive users aged 20-44, by education, according to current method of contraception, 1982 and 1988

Ethnic group and method	Years of education					
	0-11		12		≥13	
	1982	1988	1982	1988	1982	1988
Non-Hispanic whites						
Female sterilization	39	54*	26	33*	17	19
Male sterilization	12	10	16	18	12	15
Pill	22	21	26	28	22	28*
IUD	4	2	5	1**	8	2**
Diaphragm	3	2	4	3	16	11*
Condom	11	6	10	11	15	17
Other	9	5	13	6**	10	9
Non-Hispanic blacks						
Female sterilization	54	64	34	43*	23	31*
Male sterilization	1	0	1	1	3	2
Pill	18	20	39	38	37	35
IUD	11	3*	9	3*	11	4*
Diaphragm	1	0	2	1	7	5
Condom	4	6	6	7	6	12*
Other	12	6	10	7	14	12
Total	100	100	100	100	100	100

*Change from 1982 to 1988 is significant at $p \leq .05$.**Change from 1982 to 1988 is significant at $p \leq .01$.

†In this table and in Table 6, "other" consists of foam, periodic abstinence, withdrawal, douche, sponge, jelly or cream alone and other methods.

percent to 51 percent). The latter group is one that depended especially on the IUD in 1982 (12 percent of formerly married contraceptive users were relying on the IUD in that year), and it is likely that many formerly married IUD users chose female sterilization when they had their IUDs removed.

Less-educated women also switched to female sterilization in large numbers. The proportion of contraceptive users with less than a high school education who relied on female sterilization increased from 40 percent in 1982 to 52 percent in 1988—an increase of one-third.* A significant increase, from 27 percent to 34 percent, also occurred among those with a high school degree, but among women with the most education, there was no significant change in the percentage using female sterilization.

The pattern of change by income was similar to the pattern by education. The proportion using female sterilization climbed sharply in the lowest income-group (from 26 percent to 37 percent), increased moderately in the middle income-

group (from 25 percent to 32 percent) and rose only slightly (from 21 percent to 22 percent) in the highest income-group.

The increase in use of female sterilization was sharp among Hispanic women (from 23 percent to 32 percent), but it was significant only at $p < .10$ because of the relatively small number of Hispanic contraceptive users in the sample (342 cases). Like formerly married women, Hispanic contraceptive users depended heavily on the IUD in 1982, and it is likely that many Hispanic IUD users also switched to sterilization. The increase in female sterilization among black contraceptive users (from 30 percent to 38 percent) was also notable, but the increase among non-Hispanic white women (from 22 percent to 26 percent) was more modest.

In all, increases in the use of female sterilization between 1982 and 1988 were sharpest among the formerly married, among the less educated and among low-income, Hispanic and black women. Among the best-educated and most affluent women, there was no significant increase in the use of female sterilization between 1982 and 1988. None of the changes in male sterilization shown in Table 4 were statistically significant.

•*Trends in pill and IUD use.* Changes in the use of oral contraceptives were generally modest between 1982 and 1988. The only decline was in the proportion of teenage contraceptive users who were using the pill (from 64 percent to 59 percent), and it

was not statistically significant. The percentage of 20-24-year-olds who were using the pill increased sharply and significantly, however, from 55 percent to 68 percent. The proportion of women ages 25-29 who were using the pill also increased markedly, from 35 percent to 45 percent. The seeming increase in pill use among never-married women (from 53 percent in 1982 to 59 percent in 1988), though, was significant only at $p < .10$, and the changes among currently married and formerly married women were not significant.

There were modest increases in pill use, mostly among the better educated, among higher-income women and among white women. Among women with 13 or more years of schooling, the proportion using the pill increased from 24 percent to 29 percent. This statistically significant increase suggests that many of the better-educated women who stopped using the IUD may have switched to the pill. In the highest income-category and among white women, the proportion using the pill increased marginally (significant only at $p < .10$).

The percentage of users relying on the IUD declined in every category shown in Table 4, and the decline was statistically significant in every category except among 15-19-year-olds and 40-44-year-olds. Overall, the proportion of women using the IUD declined from seven percent to two percent. This decline was especially sharp among women aged 25-34—from 10 percent to one percent at ages 25-29 and from nine percent to three percent at ages 30-34. Declines in IUD use were also quite sharp among formerly married women and among less-educated women (both from 12 percent to four percent). The largest decline occurred among Hispanic women: Nineteen percent of Hispanic contraceptive users were relying on the IUD in 1982, compared with five percent in 1988.

•*Trends in diaphragm and condom use.* Use of the diaphragm declined slightly between 1982 and 1988, from eight to six percent (Table 4). The trend in diaphragm use, however, can be seen most clearly by intention to have more children: There was no change at all in the percentage of diaphragm users among women who did not intend to have any more children (four percent in both years), but the proportion of diaphragm users among women who intended to have more children declined by half, from 15 percent to eight percent.† The decline was marked and significant in each of the three youngest age-groups:

*This increase is not affected by age-standardization.

†Additional tabulations (not shown in the tables) reveal that concurrent with the decline in diaphragm use, condom use increased significantly both among never-married women who intended to have children in the future (from 14 percent to 22 percent) and among those who did not intend to have more children (from five percent to 14 percent).

those 15-19, 20-24 and 25-29. Among never-married women, the decline was from 13 percent to five percent, a drop of almost two-thirds.

Condom use increased slightly overall, from 12 percent to 15 percent, but the changes in condom use appeared to mirror the changes in diaphragm use. Among women who intended to have more children, use of the condom increased by seven percentage points (from 15 percent to 22 percent); concurrently, use of the diaphragm fell by seven percentage points. As was the case with diaphragm use, there was no change in condom use among women who intended to have no more children.

The proportion of teenagers using the condom increased significantly, from 21 percent to 33 percent; a significant increase also occurred among 25-29-year-olds, but there were no significant changes among 30-44-year-olds. Among never-married contraceptive users, the proportion using the condom increased by eight percentage points (from 12 percent to 20 percent), an amount comparable to the fall in diaphragm use. None of the changes by education were statistically significant; changes by income were not marked, but the increase among low-income women (from nine percent to 13 percent) was significant. Condom use increased in all three race/ethnicity subgroups, but the increase was greatest among Hispanic women (from seven percent to 14 percent) and smallest among white women (from 13 percent to 15 percent); the latter difference was significant only at $p < .10$.

Overall, diaphragm use declined and condom use increased among younger women, never-married women and those who intended to have more children. This change probably occurred because of concern about sexually transmitted diseases (STDs), including AIDS. Use of these methods was unchanged among married women, among women 30 and older and among those who intended to have no more children.

Trends by Race and Education

Table 4 showed strong differences in contraceptive choice and in the trends in use of certain methods by race and education. This is consistent with previous research, which has indicated that race and education are associated with contraceptive use at every stage of the life cycle.¹² Table 5 shows the trends by education separately for non-Hispanic white women and for non-Hispanic black women. (There were not enough Hispanic women in the sample

to permit such an analysis among them.)

The percentages of white women using female sterilization, the diaphragm and the condom all differ markedly by education. The proportion of white contraceptive users relying on female sterilization is nearly three times as high among those with the least education (54 percent) as among those with the most education (19 percent). What did better-educated white women use instead of female sterilization? In 1988, they used a variety of methods: The percentages using male sterilization, the pill, the diaphragm and the condom were all significantly higher in the highest educational group than in the lowest educational group.

Comparing the two panels of Table 5, we can see that the percentage of women using female sterilization was higher and the percentage using male sterilization was lower among black contraceptive users than among white contraceptive users in each educational category. In 1988, the difference was at least 10 percentage points in each category: For example, at 0-11 years of education, 64 percent of black method users and 54 percent of white method users relied on female sterilization, while among those with the most education, 15 percent of white contraceptive users and two percent of black contraceptive users relied on male sterilization. In the two highest educational groups, there were also significant racial differences in the percentages using the pill, the diaphragm and the condom: Black women were more likely than white women to use the pill and were less likely to use the diaphragm or condom.

What were the trends in use by education and race between 1982 and 1988? Among the least-educated whites, the proportion using female sterilization increased by 15 percentage points, from 39 percent to 54 percent. In this group, none of the changes in the use of other methods were significant, but all represented decreases from 1982. Among the most highly educated white women, the pattern was entirely different: The change in the use of female sterilization was not significant, and the only significant changes were an increase in pill use (from 22 percent to 28 percent) and declines in reliance on the IUD (from eight percent to two percent) and the diaphragm (from 16 percent to 11 percent). Thus, between 1982 and 1988, the least-educated white women moved toward female sterilization and away from all other methods, while the best-educated white women moved away from the IUD and diaphragm and toward the pill.

Trends in contraceptive use by education among black women differed from those among white women in several ways. Among the least-educated black women, the proportion using the IUD dropped significantly (from 11 percent to three percent) and the proportion using female sterilization rose by 10 percentage points (from 54 percent to 64 percent), a differential that (because of small numbers) came close only to marginal statistical significance at $p < .10$. Among the best-educated black contraceptive users, the proportion using female sterilization increased significantly (from 23 percent to 31 percent), as did the proportion using the condom (from six percent to 12 percent). The percentage using the IUD dropped from 11 percent to four percent. Thus, the changes in contraceptive use among college-educated blacks—a decrease in IUD use and an increase in use of female sterilization—were more similar to the trends among other blacks than they were to trends among whites in the same educational category.

Trends by Marital Status

Table 6 (page 204) shows trends by marital status in contraceptive use among white women and black women. One of the most striking findings (seen in the first panel, which shows trends among never-married women) is the sizable racial difference in 1988 in female sterilization: Nineteen percent of never-married black contraceptive users were relying on female sterilization in 1988, compared with only two percent of never-married whites. More than half of births to black women are to unmarried women,¹³ so never-married black women are much more likely than never-married white women to have already had all the children they want: Tabulations not shown in the tables indicate that 42 percent of never-married black contraceptive users do not intend to have more children, compared with just 16 percent of comparable whites.

However, even among never-married women who do not intend to have any more children, blacks are much more likely than whites to use female sterilization: Between 1982 and 1988, the proportion of never-married white contraceptive users who wanted no more children and relied on female sterilization rose from five percent to 15 percent, while among comparable blacks, this proportion increased from 37 percent to 46 percent. Thus, never-married black women who have completed their families are three times as likely as comparable whites to use steril-

Table 6. Percentage distribution of contraceptive users aged 15-44, by marital status and current method of contraception, according to race/ethnicity, 1982 and 1988

Marital status and method	Non-Hispanic white		Non-Hispanic black	
	1982	1988	1982	1988
Never-married				
Female ster.	1	2	13	19*
Male ster.	2	2	0	0
Pill	53	60	58	56
IUD	3	1	8	3*
Diaphragm	17	6**	3	2
Condom	14	22*	8	13*
Other	10	7	10	8
Currently married				
Female ster.	26	30	37	48*
Male ster.	17	20	4	2
Pill	18	19	25	25
IUD	6	2**	10	3**
Diaphragm	7	7	4	3
Condom	15	15	7	10
Other	11	8	14	10
Formerly married				
Female ster.	36	49*	55	66
Male ster.	5	5	0	0
Pill	31	28	19	16
IUD	9	3	12	6
Diaphragm	8	7	3	2
Condom	2	5	2	4
Other	10	5	11	6
Total	100	100	100	100

*Change from 1982 to 1988 is significant at $p \leq .05$.**Change from 1982 to 1988 is significant at $p \leq .01$.

ization. This finding deserves more detailed investigation.

The data suggest that among never-married white contraceptive users, use of the pill increased from 53 percent to 60 percent between 1982 and 1988; this change is significant only at $p < .10$. Condom use increased from 14 percent to 22 percent, and the percentage using the diaphragm dropped by two-thirds. However, trends among never-married black contraceptive users were very different. In contrast to whites, the proportion of never-married blacks using female sterilization rose significantly (from 13 percent to 19 percent), while use of the diaphragm and the pill did not change significantly. Use of the condom increased in both racial groups but, like diaphragm use, it remained significantly lower among never-married blacks than among never-married whites.

Currently married white contraceptive users were much less likely than married black users to rely on female sterilization (30 percent vs. 48 percent) and were also less likely to use the pill (19 percent vs. 25 percent). White couples were far more likely to use male sterilization (20 percent vs. two percent) and were significantly more likely to use the diaphragm or con-

dom. These findings are consistent with those of previous research.¹⁴

Among married white contraceptive users, the increase in reliance on female sterilization was small—from 26 percent to 30 percent—and not statistically significant; it was accompanied by a nonsignificant increase in the use of male sterilization. The decrease in IUD use was significant among both white and black contraceptive users. The most striking change, however, was the 11 percentage-point increase in the use of female sterilization among married black contraceptive users, from 37 percent to 48 percent. Overall, from 1982 to 1988, there was a more pronounced shift to female sterilization among married blacks than among married whites.

We noted earlier that currently married black contraceptive users were more likely to rely on the pill than were married whites. In contrast, formerly married black contraceptive users were less likely than comparable whites to use the pill (16 percent vs. 28 percent). This is probably a result of the much higher proportion of formerly married blacks than whites who rely on female sterilization (66 percent vs. 49 percent). The patterns of change, however, were fairly similar in both groups: Female sterilization increased substantially (from 36 percent to 49 percent among whites and from 55 percent to 66 percent among blacks), while use-levels of male sterilization, the pill, the condom and the diaphragm did not change significantly in either group, and IUD use decreased by six percentage points in both groups. In general, formerly married contraceptive users of both races reduced their reliance on the IUD between 1982 and 1988 and markedly increased their use of female sterilization.

Discussion

Future research may focus on three principal events to explain the changes in the use of female sterilization, the pill and the IUD between 1982 and 1988: the aging of the baby-boom generation; the withdrawal of the IUD from the U.S. market by two of its major manufacturers; and the rising concern with human immunodeficiency virus (HIV) infection and other STDs. Although these speculations should be tested, they seem to be consistent with the changes that occurred between 1982 and 1988.

There was a pervasive decline in IUD use between 1982 and 1988 in all subgroups, especially among those who relied heavily on the device, including for-

merly married women, less-educated women and Hispanic women. Among black women, Hispanic women, women with low levels of education, low-income women and formerly married women, declines in the use of the IUD between 1982 and 1988 were associated with increases in female sterilization. If these women were seeking an alternative that was at least as effective as the IUD, they had only three choices: the pill, male sterilization and female sterilization.¹⁵ However, male sterilization has never been a popular choice in these particular subgroups.¹⁶ It is not clear why these women did not return to pill use, as some better-educated white women did. Further research is needed to address questions not answerable with this data set: Do better-educated white women and less-educated minority women receive similar information and advice about the pill? What sources of influence (such as friends, health care providers or partners) affect the decisions of women 30 and older to choose sterilization over other methods of contraception? Do women of different ethnic and socioeconomic backgrounds evaluate contraceptive methods differently?

Among white women with high levels of education and among high-income women, declines in IUD use were associated with increases in pill use. Among college-educated black women, on the other hand, there was no similar increase in pill use; instead, use of female sterilization increased. Research is needed to determine whether the perceptions of college-educated white women (and their doctors) regarding the risks of using the pill differ from those of minority and less-educated women. Another hypothesis that needs testing is whether better-educated women have greater access to the regular health care required for continued use of the pill.

Why is female sterilization the most popular method among ever-married women? In the discussion of the age-standardized percentages computed in this article, we noted that part of the increase in female sterilization was caused by increases in the numbers of older women. This is, of course, because the baby-boom generation was 24-42 years of age in 1988—the age-range within which many choose sterilization—and the number of women aged 25-44 increased by 5.3 million between 1982 and 1988. In contrast, the younger cohorts (those aged 15-23 in 1988) are being filled by the baby-bust generation, and the number of women aged 15-24 decreased by 1.5 million in the period 1982-1988.

The rest of the increase in reliance on sterilization since 1982 (and the very large increases in female sterilization since 1973) might be explained in the following way.¹⁷ First, by age 30, about three out of four ever-married women have had all the children they want. Typically, women who become sterilized are about 30 years old and have 2-3 children when they have the operation. Thus, such women may have 10-15 years of fecund life remaining, in which they would be capable of achieving a pregnancy but do not want one. Most of them have used the pill, so it is likely that they want to use a method that is, like the pill, coitus-independent (or unobtrusive) and very effective. Until 1985 or 1986, three methods besides the pill met those criteria: the IUD, female sterilization and male sterilization. However, after the withdrawal of the IUD in 1985 and 1986, women older than 30-35 who wanted effective, coitus-independent contraception and for whom the pill was not appropriate were left with male or female sterilization as the only available choices.

Moreover, in the past 20 years, the medical techniques of female sterilization have become safer and markedly easier, to the point where it is usually an outpatient procedure. Finally, the groups in which female sterilization increased the most—formerly married women, never-married and currently married blacks, and Hispanic women—have never relied on male sterilization in large numbers. (Research is needed to explain this.) For women in these groups who already have all the children they want, female sterilization seems to be the best of the choices available: It produces effective, unobtrusive contraception and is a relatively safe, widely available procedure that is often covered by public or private health insurance.

The proportion of teenage contraceptive users who relied on the condom rose from 21 percent in 1982 to 33 percent in 1988. Increases in condom use and decreases in diaphragm use also occurred among women in their 20s, among never-married women and among those who intended to have children in the future. These changes may be related to the increasing concern with HIV infection and other STDs. Research is needed to explain what differentiates young condom users from young pill users (the majority in that age-group).

The patterns of method-switching that produced the observed trends in contraceptive use between 1982 and 1988 should be studied further. Did the women who abandoned the IUD switch directly to sterilization? Or did they switch to a less-effective method or to no method at all, experience an unintended pregnancy and then choose sterilization? Why did some teenagers begin using the condom and others not? Why did some never-married women who stopped using the diaphragm, use the condom and others the pill? Are women with multiple partners more likely to choose the condom? How extensive is the use of condoms for protection against STDs, and what are the characteristics of women who use condoms for this purpose? These questions, and the other hypotheses suggested earlier in this article, deserve the careful attention of demographic and public health researchers.

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The Sexual and Reproductive Behavior Of American Women, 1982–1988

By Jacqueline Darroch Forrest and Susheela Singh

Summary

Comparison of 1988 data from the National Survey of Family Growth with 1982 data reveals that the proportion of U.S. women who have had sexual intercourse rose slightly, from 86 percent to 89 percent. Among teenagers, the proportion sexually active rose from 47 percent to 53 percent; most of the change is attributable to increases occurring among white and nonpoor teenagers, thus narrowing racial and income differences.

Among women aged 15–44 in 1988 who have ever had intercourse, 67 percent reported that they had had two or more sexual partners in their lifetime. The proportion was highest among women aged 20–34 (about 70 percent), but 58 percent of sexually active teenage women reported having had two or more sexual partners. About 67 percent of women of reproductive age in 1988 were exposed to the risk of unintended pregnancy, up from 63 percent in 1982. Among these women, 35 percent rely on contraceptive sterilization to prevent pregnancy and 55 percent use reversible methods, while 10 percent use no method. Poor women are much more likely than nonpoor women to be using no method of contraception (15 vs. eight percent); among poor teenagers, this proportion reaches 25 percent. The level of contraceptive use at first intercourse among teenage women improved substantially between 1982 and 1988, however, rising from 48 percent to 65 percent.

During 1984–1988, almost four in 10 births and almost six in 10 pregnancies among American women were unintended; most of these were mistimed, but 12 percent of births were unwanted ever. Preg-

Thirty-four percent of women 18–19 (and half of all males this age) had had multiple partners in a one-year period. The proportion declines steadily with increasing age, to five percent of women and 13 percent of males aged 40–44.

nancies among teenagers were the most likely to be unintended—82 percent in 1988 compared with 78 percent in 1982.

Introduction

Perhaps in no area do the personal and the public spheres of human activity overlap as they do in the realm of reproductive behavior. The reproductive behavior of American men and women profoundly influences the direction and shape of society and at the same time is influenced by a wide range of circumstances conditioned by society. All reproductive behavior—including sexual activity, marriage, pregnancy, childbearing, abortion, the use of contraceptives to regulate the number of births and to space births and the failure to use contraceptive methods—is considered a deeply private and personal area of human behavior. However, reproductive patterns have both long-term societal implications (in relation to their effect on the age-structure of the population and on trends in population size and growth, among other consequences) and short-term implications (in terms of the need they generate for family planning and maternal and child health services, for example). In addition, patterns of reproductive behavior are not static; rather, they are influenced by changing social conditions, changing attitudes toward sexuality and changing contraceptive technologies. Because reproductive behavior does evolve over time, and because of the many ways in which the data on this subject are used, it should be regularly updated and made available to a wide audience.

Investigation into reproductive behav-

ior in the United States has been almost continual since 1955, when the first national survey in this area, the Growth of American Families, was carried out; this survey was repeated in 1960.¹ These investigations were followed by a series of National Fertility Surveys conducted by Princeton University in 1965, 1970 and 1975,² and then by the National Surveys of Family Growth (NSFG) in 1973, 1976, 1982 and 1988 by the National Center for Health Statistics (NCHS) of the Department of Health and Human Services.³

In this article, we examine selected findings from the two most recent rounds of the NSFG (conducted at the start and at the end of the 1980s) along with other data to identify trends over the decade in marriage, sexual activity, exposure to the risk of pregnancy, pregnancy planning and birth intentions among U.S. women of reproductive age. The analysis is based on data obtained from Cycle III of the NSFG, conducted in 1982 among 7,969 U.S. women aged 15–44, and from Cycle IV, conducted in 1988 among 8,450 women aged 15–44.* The findings from the 1982 round of the survey have been widely analyzed and published in a variety of forms.⁴ This article is a summary of some highlights from the 1988 survey and trends

*Throughout this article, we use the age of respondents as of March 15, 1988. Women aged 15–44 were selected for the survey on the basis of their age at this date, and sample weights to produce national population estimates were based on the age-distribution at this date. Women were interviewed over a period spanning January to August 1988, so that age at the time of interview may differ slightly from age as of March 15, 1988.

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since 1982. Our discussion focuses on statistically significant differences ($p < .05$); other differences that are mentioned because they are large or form a consistent pattern will be identified as nonsignificant. The 1988 NSFG data will undoubtedly be subjected to more refined, in-depth analysis in the coming years.⁵

Changing Characteristics

Between 1982 and 1988, the number of U.S. women of reproductive age (15–44) increased from 54.1 million to 57.9 million, as Table 1 indicates. As a result of the large cohort born during the baby-boom period of the late 1940s and the 1950s, the number of women now in their 30s and 40s is larger than at any other time in American history. Moreover, because of declining birthrates since that time, these women constitute a relatively larger proportion of all women of reproductive age than previously, which means that the average age of the total group is somewhat higher than in the past. For example, the proportion of women of reproductive age who are 30–44 increased from 44 percent in 1982 to 49 percent by 1988, while the proportion younger than 25 declined from 37 percent in 1982 to 32 percent in 1988. The older average age of women by 1988 in itself implies change in the overall patterns of reproductive behavior during the decade.

In 1988, 50 percent of women aged 15–44 were currently married, two percentage points lower than in 1982. The proportion who were widowed, divorced or separated (formerly married) increased slightly, from 12 to 13 percent. As a result, the proportion ever-married remained virtually unchanged over the eight-year period. This apparent stability is, however, a function of the group's higher average age, since the proportions ever-married and currently married declined in every age-group (not shown). If age-standardization were applied (that is, if women in 1988 had the same age-distribution as in 1982), 60 percent of women in 1988 (rather than the reported 64 percent) would have been ever-married, and 48 percent (rather than 50 percent) would be currently married.

While a slightly smaller proportion of women were legally married in 1988 than in 1982, the total proportion living in a union was similar to that reported in 1982—about 55 percent—because the proportion of all women who were in a cohabiting relationship rose from three percent to five percent. As a result, about one in 20 women in a union in 1982, compared with one in 10 in 1988, were not legally married. Cohabitation is still at a low level when

Table 1. Number and percentage distribution of all U.S. women 15–44, by various background characteristics, National Surveys of Family Growth (NSFG), 1982 and 1988

Characteristic	1982		1988	
	N (in 000s)	%	N (in 000s)	%
Total	54,099	100.0	57,900	100.0
Age-group				
15–19	9,521	17.6	9,179	15.9
20–24	10,629	19.6	9,413	16.3
25–29	10,263	19.0	10,796	18.6
30–34	9,381	17.3	10,930	18.9
35–39	7,893	14.6	9,583	16.6
40–44	6,412	11.9	7,999	13.8
Marital status				
Currently married	28,231	52.2	29,147	50.3
Formerly married	6,704	12.4	7,695	13.3
Never married	19,164	35.4	21,058	36.4
Type of union				
Legally married	28,231	52.2	29,147	50.3
Currently cohabiting	1,634	3.0	2,987	5.2
Formerly married, not cohabiting	6,113	11.3	6,498	11.2
Never married, not cohabiting	18,121	33.5	19,268	33.3
Race/ethnicity				
Non-Hispanic white*	42,882	79.3	44,935	77.6
Non-Hispanic black	6,824	12.6	7,408	12.8
Hispanic	4,393	8.1	5,557	9.6
Poverty level†				
<100%	8,328	15.4	8,298	14.3
≥100–199%	11,981	22.1	11,055	19.1
≥200% of poverty	33,790	62.5	38,547	66.6

*In this and subsequent tables, the subgroup of non-Hispanic whites includes Asians and others who are not black or Hispanic.

†In 1988, the federal poverty level was equivalent to a total income of \$11,611 for a family of four; in 1982, it was \$9,862.

compared, for example, with Great Britain, where 14 percent of women under the age of 60 were cohabiting in 1980.⁶ However, the practice is somewhat more widespread in the United States than is demonstrated by these numbers. One-third of all women aged 15–44 in 1988 said they had cohabited at some time in their lives.

The racial and ethnic distribution of U.S. women of reproductive age changed only slightly between 1982 and 1988; the major shift was a small reduction in the white population (throughout our analyses, this

group includes all non-Hispanics who are not black) and a small though proportionately greater increase in Hispanics.

The proportion of women with family incomes below 200 percent of the official poverty level dropped from 38 percent in 1982 to 33 percent in 1988, reflecting a decrease in poverty since the economic recession of the early 1980s. However, the proportion of women who were very poor (living below 100 percent of the poverty level) changed very little, from 15 to 14 percent. Some of the decline can be ac-

Table 2. Percentage of U.S. women with family incomes of less than 200 percent of the official poverty level, by age-group, according to type of union and race/ethnicity, 1988 NSFG

Age-group	Total	Type of union				Race/ethnicity		
		Currently married	Cohabiting	Formerly married*	Never married*	Non-Hisp. white	Non-Hisp. black	Hispanic
15–44	33	23	30	52	44	28	56	51
15–19	49	66	46	†	48	44	69	56
20–24	42	33	41	72	45	35	67	57
25–29	32	25	20	58	38	26	54	43
30–34	30	23	19	52	42	23	52	56
35–39	26	18	†	51	31	21	45	50
40–44	22	16	†	44	29	18	43	42

*Not cohabiting.

†Fewer than 20 respondents.

Table 3. Percentage of women who had ever had intercourse and who had had intercourse in the previous three months, by marital status and age-group, 1982 and 1988 NSFG

Age-group	All women				Never married*				Formerly married*	
	Ever had intercourse		Last 3 months		Ever had intercourse		Last 3 months		Last 3 months	
	1982	1988	1982	1988	1982	1988	1982	1988	1982	1988
15-44	86.4	88.5	77.4	77.6	59.3	65.5	44.9	49.0	67.8	60.8
15-19	47.1	53.2	40.0	42.5	42.1	49.5	34.3	38.5	†	†
20-24	85.7	86.4	75.5	75.8	72.3	74.8	54.4	59.9	85.9	63.2
25-29	96.7	94.8	89.3	85.4	83.8	79.9	60.3	61.1	78.9	63.8
30-34	98.0	98.0	89.7	88.2	81.3	84.8	52.5	53.6	70.3	67.5
35-39	97.9	97.9	88.8	86.5	67.5	78.1	42.4	50.8	60.7	62.6
40-44	98.2	98.9	85.5	84.3	63.0	84.5	22.9‡	33.6	52.4	48.9

*Not cohabiting.

†Fewer than 20 respondents.

‡Denotes proportion with relative standard error of 30 percent or more.

counted for by the change in age-structure among women of reproductive age, since older women are generally more affluent than younger women. If the age-distribution had remained unchanged between 1982 and 1988, 35 percent of women of reproductive age would have been living below 200 percent of poverty in 1988.

While it is encouraging to find that poverty levels have fallen slightly among U.S. women of reproductive age, differentials in this measure by women's age, their marital status and their race remain wide. Table 2 (page 207) shows the percentage of U.S. women living below 200 percent of poverty in 1988, in terms of these three variables. Overall, those least likely to be poor are married women (23 percent live below 200 percent of poverty) and non-Hispanic whites (28 percent). Those most likely to be poor are women who have been divorced, widowed or separated (52 percent) and black women (56 percent).

If poverty is viewed by age-group as well as by marital status and race, the situation of some subgroups is even worse. For example, among women aged 20-24 who are formerly married, 72 percent live below 200 percent of poverty; among women aged 15-24, 67-69 percent of blacks have family incomes below 200 percent of the official poverty line. The advantage of

increased age can be seen among currently married women aged 40-44, 16 percent of whom are below 200 percent of poverty compared with 66 percent of married women aged 15-19. The continuing disadvantage of minority status, even among older women, can be seen in poverty levels that are more than twice as high among blacks and Hispanics aged 30-44 as among comparable white women.

Sexual Activity

Did levels of sexual activity among U.S. women rise or fall during the 1980s? Table 3 summarizes the percentage of women who had ever had sex and the percentage who had had sex in the three months before the survey for the years 1982 and 1988. There was a slight increase (from 86 percent to 89 percent) in the proportion of women who had ever had sexual intercourse; however, about half this change is accounted for by the increase in age of the overall group between the two survey years. If U.S. women had had the same age-distribution in 1988 as in 1982, the proportion who had had sexual intercourse would have risen only one percentage point instead of three. Part of the increase is real, though, mainly because of the increase in sexual activity that occurred among teenagers: The proportion who had

ever had intercourse rose from 47 percent in 1982 to 53 percent in 1988.

Not all women who have had intercourse are in a current sexual relationship. In 1988, for example, 89 percent of all women 15-44 had ever had sexual intercourse, but only 78 percent had had sex within the previous three months; that is, 88 percent of sexually experienced women were in a current sexual relationship. Sexual activity is more sporadic among younger women: Eighty percent of teenagers with some sexual experience were in a current sexual relationship.

The data in Table 3 also show that a high proportion of women not currently in a union are sexually active. The proportion of never-married women who had ever had sex increased significantly (from 59 percent in 1982 to 66 percent in 1988), particularly among the oldest and youngest age-groups. The proportion in a current sexual relationship increased overall, and the increase was largest (although not statistically significant) among women aged 35-44. Formerly married women were somewhat less likely to be in a sexual relationship in 1988 than in 1982 (68 percent in 1982 and 61 percent in 1988). The decline occurred in most age-groups, but was largest among those aged 20-29.

Table 4 reveals that the increase in the proportion of teenagers who had ever had intercourse was primarily attributable to increases among white and among non-poor teenagers. Overall, there was only a small increase in the proportion of non-Hispanic black teenagers aged 15-19 who had had sex, but there was an 18 percent increase among non-Hispanic whites (from 45 to 52 percent). Teenagers living in families with incomes of less than 200 percent of poverty reported little change in their level of sexual experience, whereas teenagers with higher family incomes experienced a 25 percent increase (from 40 percent in 1982 to 50 percent in 1988). As a result of these changes, the differentials in sexual experience between white and black teenagers and between those from more and less affluent families had greatly narrowed by 1988. For example, in 1982, non-Hispanic white teenagers had the lowest level of sexual activity, 15 percentage points lower than that of non-Hispanic blacks; by 1988, this differential had narrowed to only eight percentage points. Similarly, the income differential also declined sharply, from 16 percentage points in 1982 to only six points in 1988.

Among women aged 15-17, levels of sexual experience increased somewhat among both whites and blacks, but hardly

Table 4. Percentage of women aged 15-19 who had ever had sexual intercourse, by race/ethnicity and poverty level, according to age-group, 1982 and 1988

Race/ethnicity and poverty level	15-19		15-17		18-19	
	1982	1988	1982	1988	1982	1988
Total	47.1	53.2	32.6	38.4	64.1	74.4
Race/ethnicity						
Non-Hispanic white	44.5	52.4	29.8	36.2	60.8	74.3
Non-Hispanic black	59.0	60.8	44.4	50.5	79.1	78.0
Hispanic	50.6	48.5	35.6	36.1	70.1	70.0
Poverty level						
<200%	55.6	56.5	45.7	41.6	65.0	80.9
≥200%	39.7	50.1	23.0	35.0	63.0	69.0

Table 5. Percentage distribution of women aged 15–19 who had ever had intercourse, by contraceptive use at first intercourse, according to race/ethnicity and poverty level, 1982 and 1988

Contraceptive use	Total		Race/ethnicity						Poverty level			
	1982	1988	White non-Hispanic		Black non-Hispanic		Hispanic		<200%		≥200%	
	1982	1988	1982	1988	1982	1988	1982	1988	1982	1988	1982	1988
No method use	52.1	35.0	45.4	31.0	64.2	45.9	77.5	46.1	59.7	42.2	42.7	27.4
Any method use	47.9	65.0	54.6	69.0	35.8	54.1	22.5*	53.9	40.3	57.8	57.3	72.6
Pill	8.3	8.2	8.5	7.1	10.6	15.7	2.4*	3.9*	9.2	9.0	7.1*	7.4
Condom	22.6	47.4	24.9	51.1	18.7	34.8	12.8*	41.8	19.6	42.3	26.3	53.0
Withdrawal	13.0	8.4	16.4	9.6	4.6*	3.1*	3.8*	8.3*	8.9	6.4	18.1	10.6
Other	4.1	0.9*	4.7*	1.1*	1.9*	0.5*	3.4*	0.0*	2.6*	0.2*	5.8*	1.7*
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

*Denotes proportions with relative standard error of 30 percent or more.

changed among Hispanics. In terms of family income, levels rose only among the more affluent. Among all women 18–19 years old, 64 percent had had sexual intercourse in 1982, compared with 74 percent in 1988. However, the increase among white teenagers (from 61 percent to 74 percent) accounted for the total increase among 18–19-year-olds, since the level changed little among blacks and Hispanics. Both poor and nonpoor women 18–19 were more likely in 1988 than in 1982 to have had intercourse, but the nonpoor difference was not statistically significant.

In light of the increase in sexually transmitted diseases during the 1970s and 1980s,⁷ we are interested not only in the absolute proportion of women who have had sexual intercourse, but in the number of sexual partners they have had. In 1988, the NSFG obtained this information for the first time: Among women who had ever had intercourse, 67 percent reported that they had had two or more sexual partners in their lifetime (14 percent had had two or more legal marriages).⁸ The proportion is highest among women 20–34 (71–72 percent); it declines to 66 percent among those 35–39 and 57 percent among women 40–44. Although teenagers have been sexually active for a relatively short period of time, 58 percent of those aged 15–19 who have ever had intercourse reported having had sex with two or more partners.

If the denominator is reduced to women who had had sex in the past three months, only three percent of all women, but eight percent of teenagers, had had two or more sexual partners that time. The proportions of other age-groups having two or more sexual partners in the past three months are six percent among women 20–24, four percent among those 25–29 and two percent among women 30–44.

If these rates are viewed cumulatively (that is, if the same proportion changes

partners every three months or so), the proportion of women who have had more than one sexual partner within any given year is likely to be considerably higher. This inference is drawn from data from the 1988–1989 General Social Survey of men and women aged 18–44. Special tabulations of those who had had intercourse in the past 12 months show that 13 percent of women (and 25 percent of men) aged 18–44 said they had had two or more sexual partners in that time period. Moreover, 34 percent of women 18–19 (and half of all males in this age-group) had had multiple partners in a one-year period. The proportion then declines steadily with increasing age, to five percent of women aged 40–44 and to 13 percent of comparable males. These findings, particularly among young people, are relevant to health professionals interested in reducing the spread of sexually transmitted diseases (including the human immunodeficiency virus) and indicate that not only pregnancy prevention, but disease prevention, must be considered in counseling women on the selection of a contraceptive method.

Because the first few months after first intercourse is a period of high risk of unintended pregnancy,⁹ it is important to know whether the 53 percent of teenage women who have ever had intercourse used a contraceptive method at first intercourse and which methods they used. Table 5 shows that in 1982, 48 percent of sexually experienced women 15–19 used a contraceptive method at first intercourse—mainly the condom and withdrawal. By 1988, this proportion had risen remarkably—to 65 percent—almost entirely as a result of increased condom use. Thus, male involvement in contraceptive use at first intercourse increased substantially, from 36 percent of sexually experienced teenagers in 1982 who relied at first intercourse on condoms or withdrawal, to 56 percent

in 1988. Both contraceptive use at first intercourse and the involvement of males increased among poor and nonpoor teenagers, and among the members of all three racial groups. However, the most pronounced increase occurred among Hispanics, whose level of use at first intercourse more than doubled (from 22 percent in 1982 to 54 percent in 1988), mainly as the result of a tripling in levels of condom use (from 13 percent to 42 percent).

Use of the pill at first intercourse remained below 10 percent during the 1980s among both white and Hispanic teenagers and both poor and nonpoor adolescent women. On the other hand, pill use was slightly higher among blacks, and rose from 11 percent in 1982 to 16 percent in 1988. White teenagers and those who were nonpoor were more likely than any other subgroups to use the condom at first intercourse (51–53 percent in 1988, compared with around 42 percent among poor adolescent women and Hispanics). Black women were less likely than whites to have first intercourse with partners who used the condom (35 percent).

Risk of Unintended Pregnancy

Not all women of reproductive age are at risk of an unintended pregnancy. Table 6 (page 210) shows that almost 12 percent of women aged 15–44 in 1988 (down from 14 percent in 1982) had never had sexual intercourse.* A further seven percent in 1988

*A small number of women (mostly teenagers) had had intercourse only once. If intercourse occurred before their first menstrual period, the NSFG classified these women as having never had intercourse, and we follow that designation in the present article. If they had had intercourse after their first menstrual period and within the past three months, they were considered as being at risk and not using a contraceptive. These women were not asked about their current contraceptive use, however. It is possible that a few of them might have been using a method, which would mean that levels of current use are slightly understated.

Table 6. Percentage distribution of U.S. women aged 15-44, by exposure to the risk of unintended pregnancy, according to age-group, 1982 and 1988

Risk category	15-44		15-19		20-24		25-29		30-34		35-39		40-44	
	1982	1988	1982	1988	1982	1988	1982	1988	1982	1988	1982	1988	1982	1988
Never had intercourse	13.6	11.5	52.9	46.8	14.3	13.6	3.3	5.2	2.0*	2.0	2.1*	2.1	1.8*	1.1*
No intercourse in past 3 months	6.0	6.9	6.1	7.7	7.8	6.9	4.7	6.6	5.5	6.7	5.1	6.5	6.8	7.3
Pregnant	4.1	4.0	4.8	2.8	5.8	5.5	6.5	8.0	4.1	5.1	1.3*	1.4	0.1*	0.2*
Postpartum	0.8	0.7	0.6*	0.4*	1.2*	1.2*	1.7*	1.2	0.6*	1.0*	0.2*	0.3*	0.2*	0.1*
Seeking pregnancy	4.2	3.8	1.3*	1.1*	5.5	4.3	6.8	5.3	5.5	6.2	3.4	3.1	1.4*	1.6
Sterile	27.2	29.7	0.5	1.1	5.6	5.0	17.3	16.6	39.4	37.2	56.6	57.0	64.3	66.6
Noncontraceptively†	8.2	6.1	0.4*	0.5*	1.1*	1.2*	4.2	1.7	8.8	5.6	19.7	11.7	22.9	18.2
Contraceptively	19.0	23.6	0.1*	0.6*	4.5	3.8	13.1	14.9	30.6	31.6	36.9	45.3	41.4	48.4
Reversible-method user	36.7	36.7	24.1	31.6	51.3	55.2	52.7	49.7	36.9	36.4	24.9	24.9	19.7	17.6
Nonuser	7.3	6.7	9.7	8.6	8.4	8.2	7.1	7.5	5.9	5.4	6.4	4.6	5.6	5.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

*Denotes proportions with relative standard error of 30 percent or more.

†Data for 1982 supplied by W. D. Mosher, NCHS.

Note: The proportions of women who had not had intercourse in the last three months are slightly smaller than the proportions one would get by subtracting those who had had intercourse in the last three months, as shown in Table 3. The categories in this table were derived by following the NCHS convention of classifying women at risk of unintended pregnancy according to the following hierarchy: pregnant, noncontraceptively sterilized, contraceptively sterilized, nonsurgically sterile, currently using a contraceptive, seeking pregnancy, postpartum, never had intercourse, noncontraceptive users who had intercourse in the last three months and nonusers who had not had intercourse in the last three months. Some women in the first five categories may also not have had sexual intercourse in the past three months.

(six percent in 1982) had had sexual intercourse in the past but not within the three months prior to the survey interview. Women who are pregnant, postpartum (had had a baby in the last two months) or attempting pregnancy accounted for nine percent of women between the ages of 15 and 44 in both survey years.

The total proportion sterile, as a result of surgery or of nonsurgical causes, increased from 27 percent in 1982 to almost 30 percent in 1988. This increase was apparently attributable to the older average age of women in 1988: If they had had the same age distribution as women in 1982, only 27 percent would have been sterile.

Within this larger group, however, some changes have occurred in the proportion sterile for contraceptive reasons and in the proportion sterile for other reasons, either surgical or nonsurgical. The 1982 and the

1988 NSFG surveys used differently formulated questions to obtain information about the reasons for surgery resulting in sterility.* It may not be possible, therefore, to obtain completely comparable figures, but the NCHS has modified the method by which the contraceptive intent of sterilization was classified for the 1982 survey respondents to be as closely comparable to 1988 as possible. (This approach is described in more detail in W. D. Mosher, "Contraceptive Practice in the United States, 1982-1988," p. 198.)

The data in Table 6 reflect the modified methodology for 1982 and show that six percent of all women in 1988 (down from eight percent in 1982) were classified as sterile because of medical treatment, menopause, past infection or surgery undertaken for health reasons. In contrast, the proportion contraceptively sterilized increased from 19 percent in 1982 to 24 percent in 1988; increases in contraceptive sterilization are especially substantial at ages 35-44. Standardization for age differences would sharpen the decline in noncontraceptive sterilization (to 5.5 percent) and reduce the change in contraceptive sterilization (21.5 percent). Some of the decline in noncontraceptive sterilization may be caused by changing attitudes regarding reasons for surgical sterilization and by declines in the prevalence of hysterectomies, and some may be related to remaining differences in classification because of

the change in the questions asked in 1988.

The proportion of all women who were users of reversible methods remained about 37 percent in both 1982 and 1988, although the older average age of women in 1988 suggests that there were some small increases within age-groups, mainly among women younger than 25. The proportion of women who were not using any contraceptive method also remained about the same—approximately seven percent of all women aged 15-44.

The proportion of women not at risk of unintended pregnancy (those who had never had intercourse or had not had intercourse in the three months prior to the interview, those who were pregnant, postpartum or seeking pregnancy at the time of the interview, and those who were noncontraceptively sterile) varies considerably with age, from a high in 1988 of 59 percent among women aged 15-19 to a low of 25 percent among those aged 35-39. The distribution among the various categories reflects different patterns of reproductive behavior by age. For example, in 1988, 47 percent of teenage women but only two percent of women older than 30 had never had sexual intercourse. Although 15 percent of women 25-29 were pregnant, postpartum or trying to become pregnant, only two percent of those 40-44 were in these categories. Similarly, only one percent of women 20-24 were classified in the 1988 NSFG as noncontracep-

*In 1982, women were first asked, "Was one reason for having the operation because you had had all the children you wanted or did not want to have any more children?" They were then asked about other important reasons (if any) for having the operation. In 1988, women were first asked an open-ended question, "Why did (you/he) have the operation?" Respondents were then shown a card with a number of reasons written on it and were asked, "Which reason or reasons do you believe are closest to your own?" Women who mentioned only medical reasons in response to this second question or who mentioned medical reasons first in answering the first question were coded as sterilized for noncontraceptive reasons and the others were coded as sterilized for contraceptive reasons.

tively sterile, compared with 18 percent of those aged 40-44. However, the proportion not exposed to the risk of unintended pregnancy because of infrequent sexual intercourse varied very little with age.

When women who are not at risk have been accounted for, the remainder are women who are fertile and having sexual intercourse but do not wish to have a child in the near future—those who are contraceptively sterile, users of reversible methods and nonusers of any method. They are, therefore, considered at risk of an unintended pregnancy—a category occupied by 63 percent of women of reproductive age in 1982 and 67 percent in 1988.

The overall pattern of pregnancy prevention changed very little between 1982 and 1988; figures for 1988 are shown in Table 7. The proportion of women at risk of unintended pregnancy who are relying on contraceptive sterilization (female and male procedures) reached 35 percent in 1988. However, after age-standardization (which assumes that women in 1988 had the same age-distribution as in 1982), the proportion relying on sterilization for contraceptive purposes in 1988 was somewhat smaller (32 percent, compared with 30 percent in 1982). The proportion of women at risk of unintended pregnancy who rely on reversible contraceptive methods declined between the two survey years—from 58 percent of exposed women in 1982 to 55 percent in 1988.

The remaining women, those not relying on contraceptive sterilization nor practicing a reversible method of birth control, are at highest risk of an unintended pregnancy. The proportion—around 12 percent of all women at risk of an unintended pregnancy in 1982 and 10 percent in 1988—is low, but the absolute number of women—around four million in 1988—is substantial.

Patterns of contraceptive use vary considerably with the exposed woman's age, as Table 7 also demonstrates. Teenagers at risk of unintended pregnancy are much more likely than any other age-group to be using no contraceptive method, but that level declined from 29 percent in 1982 to 21 percent in 1988. Since older women are increasingly likely to have had all the children they want, they are much more likely than younger women to be sterilized for contraceptive purposes (exceeding 40 percent among women older than 34 in 1988). There is also a rapidly growing reliance on vasectomy as women become older, reaching about 20 percent among women aged 35-44 in 1988. As might be expected,

Table 7. Percentage distribution of women at risk of unintended pregnancy, by poverty level and contraceptive status, according to age-group, 1988

Poverty level and contraceptive status	Age-group						
	15-44	15-19	20-24	25-29	30-34	35-39	40-44
All							
Female ster.	24.8	1.2*	4.1	15.2	30.1	42.1	47.1
Male ster.	10.5	0.2*	1.6*	5.4	13.0	18.4	20.5
Reversible method	54.8	77.5	82.0	68.9	49.6	33.3	24.6
No method	9.9	21.2	12.3	10.5	7.3	6.2	7.7
<200%							
Female ster.	30.3	2.4*	9.4	27.9	41.8	56.7	61.8
Male ster.	5.5	0.0	1.4*	5.1	9.6	9.9	9.0*
Reversible method	49.5	72.5	70.4	53.4	38.2	25.2	19.0
No method	14.7	25.1	18.7	13.6	10.5	8.1	10.2
≥200%							
Female ster.	22.2	0.0	0.4*	9.0	25.1	36.9	43.4
Male ster.	12.9	0.4*	1.7*	5.6	14.5	21.4	23.5
Reversible method	57.2	82.6	90.0	76.5	54.5	36.1	26.1
No method	7.7	17.0	7.9	8.9	6.0	5.5	7.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

*Denotes proportions with relative standard errors of 30 percent or more.

women who are young and have not yet had all the children they want are considerably more likely than women in any other age-group to use reversible methods of contraception; about 80 percent of those younger than 25 and exposed to the risk of unintended pregnancy in 1988 did so.

Another factor strongly related to patterns of contraceptive use is income level. Table 7 also shows contraceptive patterns in 1988 according to total family income of less or more than 200 percent of the federal poverty level. Overall, poor women are more likely than more affluent women to be contraceptively sterilized (30 percent vs. 22 percent) and far less likely to have partners who have been sterilized (six percent vs. 13 percent), in part because they are less likely to be married. The greater tendency of poor women to become contraceptively sterilized is particularly apparent among those aged 25-29, when 28 percent of poor women exposed to the risk of unintended pregnancy have had a tubal ligation to prevent conception, compared with only nine percent of comparable women at or above the 200 percent of poverty level. The increased likelihood of vasectomy among the partners of higher-income women is most apparent among those aged 40-44, when 24 percent of non-poor women rely on male sterilization, in contrast to only nine percent of their poorer counterparts.

If levels of male and female sterilization are combined, the overall levels of protection against unintended pregnancy from contraceptive sterilization are virtually the same for the two income groups (about 35 percent), despite the greater reliance on sterilization by poor women in each age-

group. This is because poor women as a group are younger than more affluent women. However, poor women are less likely to be using a reversible method of contraception (50 percent vs. 57 percent); as a result, almost twice the proportion of poor women at risk of unintended pregnancy as of nonpoor women report no contraceptive use (15 percent vs. eight percent).

Birth Intentions

Although almost all U.S. women intend to have children at some time in their lives, many experience unplanned pregnancies—including those practicing birth control, since all methods, even when used properly, are susceptible to failure.¹⁰ Of course, women at risk of unintended pregnancy who do not use a method of birth control are even more likely than users to experience an unplanned pregnancy; a recent study estimates that 85 percent of women using no contraceptive method become pregnant within one year.¹¹

Every respondent in the NSFG sample was asked detailed questions about all pregnancies they had had and whether these pregnancies were intended.* Table 8 (page 212) summarizes the plan-

*In this analysis, we use women's reported fertility preferences only. If the respondent reported that at the time a birth was conceived, she had not planned to have a baby, the birth was considered unintended. If the woman reported that she did not ever want to have another child or any child, the unintended birth was termed unwanted. If she did want to have a baby in the future, but at a later time, the unintended birth was termed mistimed. Since the responses are retrospective information gathered after the child was born, they may underestimate the extent of unintended fertility.

Table 8. Percentage of births that were unintended, by whether they were mistimed or unwanted, according to the mother's age-group and poverty level, 1979-1982 and 1984-1988

Age-group and poverty level	Total unintended		Mistimed		Unwanted	
	1979-1982	1984-1988	1979-1982	1984-1988	1979-1982	1984-1988
Total	36.5	39.9	26.6	27.7	9.9	12.2
Age-group*						
15-19	67.4	72.6	53.7	57.0	13.7	15.6
20-24	37.7	46.1	31.2	34.6	6.5	11.5
25-29	26.3	31.9	18.7	22.9	7.6	9.0
30-34	31.4	27.1	14.8	14.2	16.6	12.9
35-39	27.3	34.3	8.3	13.4	19.0	20.9
40-44†	23.7	53.2	11.6	9.0	12.1	44.2
Poverty level‡						
<200%	44.8	50.2	31.3	32.6	13.5	17.6
<100%	51.1	58.6	34.7	33.8	16.4	24.8
100-199%	39.1	42.7	28.2	31.5	10.9	11.2
≥200%	28.6	31.8	22.2	23.8	6.4	8.0

*Measured at the time of the birth.

†Based on small numbers.

‡Measured at the time of the NSFG.

ning status of births in the 3-4 years prior to the surveys (all births occurring between January 1979 and the 1982 NSFG interview and between January 1984 and the 1988 NSFG interview) among women aged 15-44 in 1982 and in 1988, by the woman's age at the time of the birth and her poverty status at the time of the survey.*

Overall, 40 percent of recent births to women in 1988 were unintended (up from 37 percent in 1982); 28 percent were unintended because they occurred earlier than desired (mistimed), and 12 percent were to women who had wanted no more children (unwanted). Most of the overall increase in unintended births between 1982 and 1988 consists of an increase in unwanted births. While these increases are

not large enough to be statistically significant, their consistency across almost all age-groups suggests that they reflect an actual increase in the proportion of mistimed or unwanted births.

Births occurring to teenagers were the most likely to be unintended (73 percent in 1988 and 67 percent in 1982), mostly because these births occurred sooner than the mothers had wanted (about eight out of 10 unintended births). After the teenage years, the proportion of births that are unintended declines sharply, as women move into their prime childbearing years. Yet even among women aged 30-34, whose level of unintendedness is lowest and whose age-group was the only one to register a slight decline in unintended births, 27 percent of recent births were unintended.

Women with family incomes below 200 percent of poverty are much more likely than nonpoor women to report that their recent births were unintended (50 percent compared with 32 percent in 1988). The very poor (those living below 100 percent of the poverty level) were the most likely to have an unintended birth (59 percent) and to say that their births were unwanted ever (25 percent in 1988, compared with only eight percent of births among women at 200 percent or more of poverty). In addition, the growth in unintended births—and in unwanted births—between 1982 and 1988 was sharpest among very poor women. However, increases occurred among women at all levels. Although most of these differences are not statistically significant, they form a pattern that is convincing because of its consistency.

A similar analysis of planning status was carried out comparing ever-married women with those who were never-mar-

ried at the time of the survey (not shown). The analysis found that even though unintendedness is much higher among never-married women than among ever-married women, the proportion of unintended births to single women actually declined between the two surveys (from 71 percent to 64 percent). This finding suggests that the stigma of out-of-wedlock births diminished throughout the 1980s and that a sizeable proportion of never-married mothers (about one-third by 1984-1988) had intended to have a child when they became pregnant.

Pregnancy Intentions and Outcomes

The estimates of the proportion of births that are unintended, shown in Table 8, are underestimates of the proportion of pregnancies that are unintended, because they exclude pregnancies that do not end in a live birth. This problem can be addressed, however, by looking at the intention status and outcome of all pregnancies. Because abortions are severely underreported in surveys such as the NSFG, the number of total pregnancies must be estimated by using additional data on abortion from The Alan Guttmacher Institute† and the Centers for Disease Control and data on annual number of births by age from the NCHS.

As Table 9 shows, a slight decline occurred between 1982 and 1987 in the pregnancy rate among U.S. women (that is, in the total number of pregnancies per 1,000 women aged 15-44) and in the rate of intended pregnancies. There was no change, however, in the rate of unintended pregnancies. Among every 1,000 women aged 15-44 in 1987, an estimated 109 became pregnant, 48 intentionally and 61 unintentionally. Of the unintentional pregnancies, 27 resulted in abortions, 27 in live births, and eight in miscarriages.

Among teenagers, there were 127 pregnancies per 1,000 women in both 1982 and 1987. Of these, 102 per 1,000 were unintended in 1987 (81 percent), up from 98 per 1,000 in 1982 (77 percent). Of the teenage pregnancies conceived in 1987, 36 percent ended in abortions, 14 percent in miscarriages, and the remaining 50 percent in live births. These proportions were almost identical to those for teenage pregnancies in 1982.

Because only women who have had sexual intercourse are exposed to the risk of becoming pregnant, changing the denominator for this analysis from all women aged 15-44 to women of reproductive age who have ever had intercourse yields a more meaningful comparison of trends in preg-

*The NSFG did not obtain information about a woman's poverty status at the time of each reported conception or birth. Her poverty status at the time of the survey provides a rough indication of the likelihood that she had been poor during the few years preceding the survey.

†Stanley Henshaw of the AGI provided estimates of the numbers of intended and unintended births and of abortions in 1982 and 1987, by women's age at the time of conception. The numbers of births that occurred between July 1982 and June 1983 and between July 1987 and June 1988 (based on NCHS data), and abortions occurring in 1982 and 1987 (based on AGI data), were used in these calculations. The intention status of all pregnancies ending in live births was assumed to be the same as for all births in the larger time-periods shown in Table 8. All abortions were assumed to have been the outcome of unintended pregnancies. It was also assumed that for every 100 reported births, there were an additional 20 pregnancies that ended in miscarriage (spontaneous abortion), and that for every 100 reported induced abortions, there were an additional 10 pregnancies ending in spontaneous abortion. The proportions of women aged 15-44 and 15-19 in 1987 who had ever had intercourse were estimated as being 88.1 and 52.1 percent, respectively, assuming constant rates of increase in this measure between 1982 and 1988.

nancy intention and outcome. The shift in denominator, also shown in Table 9, changes the pregnancy rate in the 15-44 age-group somewhat (to 124 instead of 109 pregnancies per 1,000 in 1987) and shows about the same decline in this total number between 1982 and 1987. This is because most women aged 15-44 have had sexual intercourse and because the proportion who had done so increased only slightly between 1982 and 1987. As a result, the denominator based on sexually experienced women is not much smaller than that for all women and is similar for the two years.

Among teenagers, however, almost half of whom are still not sexually active, the pregnancy estimates are dramatically different for those who have ever had intercourse because the denominator is so much smaller. In addition, there is a bigger change between 1982 and 1987 because the proportion of teenagers who had had intercourse increased more steeply than it did among all women. In 1982, there were an estimated 271 pregnancies per 1,000 sexually experienced women aged 15-19; this number dropped by about 10 percent, to 243 pregnancies per 1,000 by 1987.

The rate of intended pregnancies among teenagers decreased even more steeply—by 24 percent—from 62 per 1,000 sexually experienced women aged 15-19 in 1982 to 47 per 1,000 in 1987. This decline was large enough to offset the increase in sexual activity; therefore, the intended pregnancy rate among all teenagers (as indicated in the two left-hand columns of the table) actually declined. The unintended pregnancy rate among sexually experienced teenagers also declined, but only by six percent. This drop was not enough to make up for the increase in the proportion of teenagers who had had sexual intercourse, so the proportion of all teenage pregnancies that were unintended rose between the two years. If the proportion of teenagers who had had intercourse had remained the same in 1987 as in 1982, the unintended pregnancy rate would have dropped instead, from 98 pregnancies per 1,000 women aged 15-44 to 92 per 1,000.

Another way of examining the intention status and outcome of pregnancies is indicated in Table 10 (page 214), which shows the percentage distribution of intended births, unintended births and abortions by the woman's age at conception. (Pregnancies ending in miscarriages are excluded from these calculations.) Overall, the percentage of pregnancies that were intended decreased slightly and the proportion unintended (ending in either an unintended

Table 9. Estimated pregnancy rates for all women of reproductive age and for sexually experienced women, by age at conception, pregnancy intention and outcome, 1982 and 1987

Age, pregnancy intention and outcome	Per 1,000 women		Per 1,000 women who had ever had sex	
	1982	1987	1982	1987
WOMEN AGED 15-44				
Total	112.5	109.2	130.2	123.9
Births	67.3	66.3	77.9	75.3
Abortions	28.8	26.9	33.3	30.5
Miscarriages	16.3	16.0	8.9	18.1
Intended	51.3	47.8	59.4	54.3
Births	42.8	39.9	49.5	45.2
Miscarriages	8.6	8.0	9.9	9.0
Unintended	61.2	61.3	70.8	69.6
Births	24.6	26.5	28.4	30.0
Abortions	28.8	26.9	33.3	30.5
Miscarriages	7.8	8.0	9.0	9.1
WOMEN AGED 15-19				
Total	127.4	126.8	270.6	243.4
Births	64.7	64.0	137.4	122.8
Abortions	45.3	45.5	96.1	87.3
Miscarriages	17.5	17.3	37.1	33.3
Intended	29.2	24.7	61.9	47.3
Births	24.3	20.5	51.6	39.4
Miscarriages	4.9	4.1	10.3	7.9
Unintended	98.3	102.1	208.7	196.0
Births	40.4	43.4	85.8	83.3
Abortions	45.3	45.5	96.1	87.3
Miscarriages	12.6	13.2	26.8	25.4

Note: Rates may not add to the totals because of rounding. In this and the subsequent table, births that occurred between July 1982 and June 1983 and those that occurred between July 1987 and June 1988 were adjusted to match the times of conception of pregnancies that ended in abortion in 1987 and 1982. Both births and abortions were adjusted to estimate women's age at time of conception.

birth or an abortion) rose slightly, from 56 percent in 1982 to 57 percent in 1988. In 1982, 26 percent of all pregnancies resulted in unintended births and 30 percent in abortions. By 1987, the equivalent proportions were 28 percent and 29 percent, respectively. In the earlier year, 54 percent of unintended pregnancies were terminated by abortion; in the later year, 50 percent.

Table 10 also shows that both the intention status and the outcome of pregnancies vary enormously with age. In 1987, for example, only 18 percent of teenage pregnancies were intended pregnancies ending in births, compared with 58 percent of those among women 30-34. Some 42 percent of pregnancies among women 15-19 were terminated by abortion, twice the proportion among women 25-34. However, the difference in the proportion of pregnancies ending in abortion is primarily the result of differences in the level of

unintended pregnancy among women of varying ages; the percentage of unintended pregnancies terminated by abortion varies relatively little with the woman's age at conception, ranging between 47 and 51 percent among women 15-34 and increasing substantially (to 59 percent) only among women 40 and older at the time of conception.

Discussion

This comparison of the 1982 and the 1988 NSFG reveals few dramatic changes in the reproductive lives of U.S. women aged 15-44. The most striking were increases of two percentage points both in the proportion of women who had ever had sexual intercourse and in the proportion who were sterile or had been sterilized. Both of these changes occurred primarily because the population of women of reproductive age was, on average, older in 1988 than in 1982. The proportion of women who were noncontraceptively sterile decreased two percentage points and the proportion who were relying on contraceptive sterilization increased almost five percentage points. Half of the increase in use of contraceptive sterilization was the result of age differences between 1982 and 1988. The rest of the increase, and the decrease in noncontraceptive sterilization, probably reflects actual behavior changes between the survey years, but this conclusion should be viewed cautiously because of changes in the questions used to classify the purpose of sterilization procedures between the two surveys.

Among teenage women, on the other hand, there have been more striking changes. The proportion of women aged 15-19 who had ever had sex continued to rise. The biggest increases were among white adolescents and adolescents in higher-income families, narrowing the previous differences by income and race or ethnicity.

Contraceptive use at first intercourse improved substantially among teenagers, although one-third of all young women are still unprotected from pregnancy the first time they have sex. Increased use of the condom at first intercourse accounts for most of the improvement, and this pattern is particularly pronounced among Hispanics. The increased reliance on the condom is probably a reflection of heightened concern about the risk of sexually transmitted diseases. It is an encouraging trend, in any case, because it suggests that the male partner in teenage sexual relationships is more involved in contraceptive practice. Nevertheless, one in every

Table 10. Estimated percentage distribution of pregnancies, by intention and outcome; and percentage of unintended pregnancies ending in abortion; according to women's age at conception, 1982 and 1987

Age-group	Intended births		Unintended pregnancies				Total	% of unintended pregnancies ending in abortion	
			Births		Abortions				
	1982	1987	1982	1987	1982	1987		1982	1987
Total	44.5	42.8	25.6	28.4	29.9	28.9	100.0	53.9	50.4
<20	21.7	18.3	37.1	40.0	41.2	41.7	100.0	52.6	51.0
20-24	45.0	39.4	24.4	29.7	30.6	30.9	100.0	55.6	51.0
25-29	57.7	54.8	20.0	23.8	22.3	21.4	100.0	52.8	47.4
30-34	52.2	57.8	24.7	21.0	23.2	21.1	100.0	48.5	50.1
35-39	49.1	44.1	16.8	25.1	34.2	30.8	100.0	67.1	55.1
≥40	36.9	23.1	11.6	31.3	51.4	45.6	100.0	81.6	59.2

five teenagers exposed to the risk of pregnancy in 1988 were not using any form of birth control; among poor teenagers, one in four were not.

The 1965 National Fertility Survey showed that 55 percent of all births in the period 1960-1965 were unintended—19 percent unwanted and 36 percent mistimed.¹² In 1984-1988, 40 percent of all births were unintended, and although this level represents a decline from the mid-1960s, it is still higher than that found in most other developed countries.¹³ Furthermore, the level appears to have increased since the early 1980s, especially among the poorest women.

Analysis shows that 57 percent of all pregnancies conceived in 1987 (excluding those that ended in miscarriages) were unintended, and that the proportion of unintended pregnancies terminated by abortion fell, from 54 percent in 1982 to 50 percent in 1987. It is unclear whether this decline represents changing attitudes toward abortion or the decreasing availability of abortion services. The findings from other studies show that the number of U.S. abortion providers has fallen since the late 1970s and that such providers increasingly tend to be concentrated in larger cities.¹⁴

The findings indicate some improvement during the 1980s, specifically an increased rate of teenagers using contraceptives and a decreased rate of unintended pregnancy among sexually active teenagers. But for the most part, the challenges of the 1980s continue into the 1990s and have become even more complicated. The fact that one in 10 women aged 15-44 and at least one in five teenagers and poor women at risk of unintended pregnancy are not using any contraceptive method is a cause for continuing concern because of the high probability of unplanned pregnancy for these women. The analyses indicate a continuation in the trend toward increasing proportions of young people hav-

ing intercourse, and the new data show that a substantial proportion of young, sexually active women are likely to have had two or more sexual partners by their early 20s, and may need to be concerned about preventing sexually transmitted diseases as well as unintended pregnancy.

Because of their enhanced risk of contracting sexually transmitted diseases and their high levels of unintended pregnancy, young people and poor women and men should continue to be the major targets of programs designed to reduce levels of unprotected sexual intercourse and to improve the efficacy of contraceptive use in the United States. Such programs have been made even more difficult, however, by reductions in the effective level of funding available for family planning services during the 1980s.¹⁵ In addition, investment in the development of improved contraceptive methods has diminished.¹⁶

Although poor and young people are deserving of special attention in programs intended to reduce unintended childbearing, the level of unintended pregnancy is extremely high among all U.S. women. A high level of unintended pregnancy is at the root of the high level of abortion in the United States. Until the problem of unintended pregnancy is addressed more effectively by policymakers, program providers and individuals, there appears to be little likelihood that the abortion issue, which has become such a troubling and divisive political concern in the United States, can be resolved.

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Barriers to Prenatal Care Among Low-Income Women in New York City

By Debra Kalmuss and Katherine Fennelly

Summary

Postpartum in-hospital interviews with 496 low-income women in New York City revealed that attitudinal and motivational barriers as well as financial obstacles are significant impediments to timely initiation of prenatal care. The two most common reasons cited by these women in explaining why they had obtained prenatal care late or not at all were motivational items: "feeling depressed and not up to going for care" and "needing time and energy to deal with other problems." In logistic regression analyses, receipt of late or no prenatal care was significantly associated with the latter motivational barrier, along with the cost of care, having no health insurance, being Hispanic, being a substance abuser and holding negative attitudes toward the use of prenatal care.

Introduction

Health care research has provided convincing evidence that timely prenatal care is important for maternal and child health.¹ Nevertheless, many women, particularly those who are young, nonwhite, poorly educated, uninsured or single, receive prenatal care late or not at all.² The common factor underlying the various characteristics associated with inadequate prenatal care is poverty, and because low-income women are at high risk of pregnancy-related complications and poor birth outcomes, it is important to identify and overcome barriers that impede their access to prenatal care services.

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Women who had no insurance were significantly more likely than Medicaid recipients to receive late care or no care, but those with private insurance were no more likely than those with Medicaid to initiate care in the first or second trimester.

Barriers to the use of these services can be classified as either structural or personal. Structural barriers are factors rooted in the organization and financing of the health care delivery system that systematically hinder access for certain groups of people. These barriers can be divided into those related to financing and insurance issues and those related to the inadequacy of the maternity care system.³ The latter group includes insufficient numbers of provider sites; long waiting times for and at appointments; the reluctance of some providers to accept Medicaid clients; complicated registration systems; limited hours; lack of child care; language barriers; and uncomfortable physical settings.

Personal barriers consist of attitudinal and motivational impediments to care. Attitudinal barriers are beliefs that either explicitly or implicitly discourage the use of formal health care services; motivational barriers include factors that make it difficult to mobilize personal resources and energy to seek health care, such as depression, family problems or substance abuse. The Expert Panel on the Content of Prenatal Care, convened by the U.S. Public Health Service, has noted that although such psychological barriers have a major impact on pregnancy outcomes and on achieving the objectives of prenatal care, they have received little research attention.⁴

The study on which this article is based examines barriers to the timely use of prenatal care among low-income black and Hispanic women and extends previous research in several ways. A descriptive

analysis compares and contrasts barriers to care cited by women receiving timely care with those reported by women who received late prenatal care or no care. Bivariate and multivariate techniques predict the effects on the timely initiation of prenatal care of a broader spectrum of factors than has previously been considered.⁵

Data and Methods

Postpartum in-hospital interviews were conducted with black and Hispanic women who gave birth in one of six New York City hospitals during 1985 and 1986. The study's purpose was to examine barriers to care among poor women; therefore, the hospitals selected were in or near areas of the city with low use of prenatal care and high proportions of low-birth-weight babies. As a result, the women in the study sample were both poorer and less likely to seek early prenatal care than a random sample of minority group women from New York City or elsewhere.⁶

To enroll sufficient numbers of women who had received late care or no care, the investigators used a retrospective, epidemiologic design in which such women were oversampled. This was necessary because only a small proportion of pregnant women receive no prenatal care at all. Interviewers were given quotas at each hospital site for women who reported that they had made their first prenatal care visit in the first trimester, those who had done so in the second trimester, and those who had done so in the third trimester, as well as for women who had received no prena-

Table 1. Percentage of low-income women who cited various structural and motivational barriers to prenatal care, by type of barrier and timing of prenatal care, New York City, 1985-1986

Type of barrier	All (N=496)	Timely care (N=269)	Late care or no care (N=227)
Motivational barriers			
Respondent's time and energy needed to deal with other problems*	45.0	27.9	65.1
Feeling of depression and not being up to going for prenatal care*	38.9	24.9	55.5
Structural barriers			
Cost of care*	17.1	7.4	28.6
Waiting time for appointment too long	13.1	12.3	14.1
Provider too far from office/home	21.2	18.6	24.2
Transportation problems*	18.5	14.5	23.3
Lack of subway/cab fare*	10.7	6.7	15.4
Provider had no evening or weekend hours	9.7	10.8	8.4
Difficulty in getting time off from school/work	10.3	10.8	9.7
No one to take care of children*	17.7	14.1	22.0
Difficulty in finding provider willing to accept new clients	4.4	3.7	5.3
Fear that patients would find out about pregnancy*	7.1	4.8	9.7
Potential problems with immigration	1.0	0.4	1.3

*Differences between groups significant at $p \leq .05$.

tal care.* Among the 540 women in our sample, 26 percent initiated prenatal care in the first trimester, 28 percent in the second trimester and 30 percent in the third trimester; 15 percent received no prenatal care.

This sampling technique results in two forms of bias. First, because women who received late care or no care were deliberately oversampled, the study results are not representative of all women delivering in hospitals in disadvantaged areas of New

York City. These findings, therefore, can be used to examine the determinants of timing of care for poor women, but not to estimate the proportions of women who come in for care during a given trimester. Second, this sampling procedure fixes the distribution of the dependent variable. This artificial constraint on the variance of the outcome measure can, in turn, produce biased regression coefficients. However, this problem can be overcome by using logistic regression; statisticians have shown that, unlike other multivariate techniques, logistic regression generates unbiased coefficient estimates in this type of study design.⁷

So that our results could be compared to those from previous studies,⁸ we classified prenatal care as either timely (care initiated in the first or second trimester) or as late (third-trimester) or no care. Of the interviewed women, 54 percent had received timely care and 46 percent had received late care or no care. The analyses presented in this article are based on 496 women for whom we had complete data on all relevant variables.

The study questionnaire used both open-

ended and closed questions to identify barriers to prenatal care. In the closed questions, respondents were asked whether various factors made it difficult for them to obtain prenatal care. Two of the 13 listed factors were motivational barriers to care and 11 were structural barriers.

The background and health characteristics included in this analysis were: age, marital status, parity, race/ethnicity, education, public assistance status, type of health insurance, whether respondents had had a regular health care provider before they became pregnant and whether they had had a substance abuse problem while pregnant.[†]

For the descriptive analysis, age was coded as a categorical variable distinguishing among women aged 19 or younger, those aged 20-24 and those aged 25 or older; for the regression analyses, it was coded as a continuous variable ranging from 13 to 41. Race/ethnicity was coded 1 if respondents were Hispanic and 0 if they were non-Hispanic blacks. Health insurance was measured as a series of dummy variables distinguishing between respondents who had private insurance, those whose care was paid for by Medicaid and those who had no insurance. Each of the remaining variables was a dummy variable coded 1 if respondents had the characteristic and 0 if they did not.

A summary measure of attitudes toward the use of health care services was based on responses to seven items assessing respondents' attitudes toward the use of medical services in general. On the summary measure, a high score represents agreement with positive attitudes toward service utilization and a low score represents disagreement. Attitudinal barriers to prenatal care were measured according to agreement or disagreement with three statements about prenatal care. Responses to each statement were coded 1 if the underlying attitude would encourage the use of prenatal care and 0 otherwise. Finally, summary measures were created from the number of structural obstacles (range, 0-3) and the number of motivational obstacles (range, 0-2) that women reported in response to the closed-ended questions on barriers to care.

We first compared the frequency with which women receiving timely care and women receiving late care or no care reported each of the specific structural and motivational barriers to care included in our study. We then compared the bivariate relationship between the timing of prenatal care and each of our predictor vari-

*These self-reports on the initiation of care were used instead of medical record data because medical charts often have incomplete information concerning care received at other institutions, and because charts were not available for all women.

†We obtained two types of data on substance abuse: medical record data and respondent's self-reports of substance use during pregnancy. As would be expected, the medical chart data provide a higher estimated rate of substance abuse (20 percent vs. 10 percent). The logistic regression model was estimated with each measure and the results were comparable. In both cases, substance abuse was significantly related to receipt of late or no care. Because there are 94 missing cases on the medical record measure of substance abuse, we present the self-report data in these analyses.

ables. Finally, we used logistic regression to test a multivariate model of the timing of prenatal care.

Results

The proportion of women who viewed each of the 13 structural and motivational barriers as an impediment to prenatal care is shown in Table 1. With two exceptions, each barrier was seen as a problem by a higher proportion of the women who received late or no care than of those who received timely care. These differences were significant for seven barriers. The number of barriers cited as problems by respondents in the two groups differed, but the nature of the most commonly cited barriers did not. The five most commonly cited barriers were virtually the same for each group, with the two motivational barriers ranking first and second in both cases. Two other items—transportation problems and the distance of the provider from a woman's home or workplace—were also among the five most prevalent barriers in both groups. Difficulty with child care was fifth for the women who had received timely care and sixth for those who had received late or no care. The largest difference in rank between the two groups was for cost of care, which was the third most commonly cited barrier for the women who had received late or no care and the ninth for those who had received care in the first or second trimester.

Table 2 presents the simple bivariate relationships between selected predictor variables and the initial timing of prenatal care. Women who were young, were Hispanic, were not married, had not graduated from high school or were on public assistance were more likely to have obtained late prenatal care or none at all than were women who were older, were married, were black or were high school graduates. The women who were most likely to receive timely prenatal care were those with private health insurance, followed by those covered by Medicaid; women with no health insurance were least likely to receive timely care.

Health-related behavior was also associated with the timing of prenatal care. Women who had had a regular provider before they became pregnant were much more likely than women with no regular provider to begin receiving prenatal care in their first or second trimester of pregnancy (64 percent versus 48 percent). Those who reported that they had had problems with drugs or alcohol were overwhelmingly more likely to have received inadequate care than those who did not report

Table 2. Number and percentage distribution of women, by selected background, health and attitudinal characteristics, according to timing of prenatal care

Characteristics	N	Timely care	Late care or no care	Total
Background variables				
Age***				
≤19	105	40.0	60.0	100.0
20–24	187	51.9	48.1	100.0
≥25	204	63.7	36.3	100.0
Marital status***				
Not married	336	49.1	50.9	100.0
Married/cohabiting	160	65.0	35.0	100.0
Parity				
1	189	54.5	45.5	100.0
2	146	57.5	42.5	100.0
≥3	161	50.9	49.1	100.0
Race/ethnicity*				
Black	269	59.1	40.9	100.0
Hispanic	227	48.2	51.8	100.0
High school graduate				
No	240	41.7	58.3	100.0
Yes	256	66.0	34.0	100.0
Receive public assistance				
No	253	58.5	41.5	100.0
Yes	243	49.8	50.2	100.0
Health insurance***				
None	114	33.3	66.7	100.0
Medicaid	297	56.9	43.1	100.0
Private	85	72.9	27.1	100.0
Health behavior variables				
Had own health provider before pregnancy***				
No	296	47.6	52.4	100.0
Yes	200	64.0	36.0	100.0
Had drug/alcohol problem during pregnancy**				
No	447	59.1	40.9	100.0
Yes	49	10.2	89.8	100.0
Attitudinal variables				
Summary measure of attitudes toward use of health services**				
Least favorable	112	42.9	57.1	100.0
Somewhat favorable	219	53.4	46.6	100.0
Most favorable	165	63.0	37.0	100.0
If feeling fine, don't need prenatal care***				
Agree	424	22.2	77.8	100.0
Disagree	72	59.7	40.3	100.0
Worried that prenatal care would reveal serious health problem				
Agree	197	49.2	50.8	100.0
Disagree	305	55.4	44.6	100.0
Nothing reassures like a prenatal care visit**				
Agree	467	58.9	41.1	100.0
Disagree	21	33.3	66.7	100.0
Number of structural obstacles***				
0	213	67.1	32.9	100.0
1	108	44.4	55.6	100.0
2	73	47.9	52.1	100.0
≥3	102	42.2	57.8	100.0
Number of motivational obstacles***				
0	226	75.7	24.3	100.0
1	124	43.5	56.5	100.0
2	146	30.1	69.9	100.0

* χ^2 is significant at $p < .05$.

** χ^2 is significant at $p < .01$.

*** χ^2 is significant at $p < .001$.

having had such problems. Although only 51 women—approximately 10 percent of our sample—admitted that they had had a substance abuse problem during preg-

nancy, 90 percent of them received care late in pregnancy or not at all, compared with 41 percent of the women who did not report having had problems with drugs or

Table 3. Logistic coefficients, by variables to predict late or no prenatal care, according to model

Predictor variables	Model 1	Model 2
Background characteristics		
High school graduate	-0.221	-0.261
Race/ethnicity (Black/Hispanic)†	0.543*	0.531*
Receives public assistance	0.429	0.583
Age	-0.044*	-0.040
Married	-0.322	-0.382
Prenatal substance abuser	1.930*	2.036*
Had regular health care provider before pregnancy	-0.109	-0.093
Has no insurance‡	1.385*	1.184*
Has private insurance‡	0.301	0.182
Barriers to care		
Cost	na	1.270*
Transportation	na	0.324
Fare	na	-0.238
Child care	na	-0.074
Fear that parents would find out about pregnancy	na	0.088
Depression	na	0.313
Family and other personal problems	na	1.149*
Number of motivational barriers reported	0.789*	na
Number of structural barriers reported	0.106	na
Attitudinal variables		
If a woman feels fine, no need for prenatal care (Agree)	1.273*	1.242*
Nothing like a prenatal care visit to make a woman feel her pregnancy is coming along well (Disagree)	1.185*	1.266*
Health care use attitude	-0.071	-0.68
Constant	1.693	1.573
-2 x log likelihood	494.31	476.30
df	14	19

*Effect significant at $p \leq .05$.

†Black is the omitted category.

‡Medicaid is the omitted category.

Note: Dependent variable is coded: late/no care=1; timely care=0.

alcohol. This pattern was repeated when we used a measure of drug abuse that was abstracted from the respondents' medical records.

Three of the four attitudinal variables were also related to the timing of prenatal care in the expected direction. Positive attitudes toward use of health care services in general, and toward prenatal care specifically, were strongly related to timely initiation of care. Women who held the least favorable attitudes toward using health care services were one and one-half times as likely as women with the most favorable attitudes (57 percent vs. 37 percent) to obtain care late or not at all. The only attitudinal item that was not significantly related to the timing of care was the concern that prenatal care providers might discover a serious health problem.

The summary measures of the number

of structural obstacles and the number of motivational obstacles reported by the respondents were also associated with the timing of prenatal care. In both cases, women who reported more obstacles were much more likely to receive late care or no care than were women reporting fewer barriers to care.

The results of the logistic regression associating the initiation of prenatal care with selected predictor variables appear in Table 3. Independent variables for this analysis were selected on the basis of significance at the bivariate level and multicollinearity (the degree to which the predictor variables were highly correlated with each other). The two models capture different aspects of reported barriers to care. Model 1 measures the effect of reported barriers to care in terms of the number of structural and motivational barriers reported; Model 2 replaces these summary variables with the actual barriers to care included in the study. In all other respects, the models are alike.

In Model 1, the log odds of receiving late or no prenatal care were significantly greater for women who were Hispanic (rather than black), were young, reported prenatal problems with drugs or alcohol, had no health insurance, reported more motivational barriers to care or disagreed with the statement that "there is nothing like a prenatal care visit to make a woman feel like her pregnancy is coming along well." The number of structural barriers that women reported, however, was not a significant predictor of the log odds of receiving late care or no care.

The results from Model 2 enabled us to determine which specific barriers to care were significantly related to the log odds of receiving late care or no care. Only two of the eight barriers included in the model—the cost of care and needing one's time and energy to deal with personal and other problems—were significant predictors of the timing of care. Except for age, all of the predictor variables that were significant in Model 1 remained significant in Model 2. The health insurance variable used in these models compares each of the included categories of health insurance (having no health insurance or having private insurance) to the omitted category (having Medicaid coverage). The results indicate that the women who had no insurance were significantly more likely than those with Medicaid coverage to receive late care or no care, but that those with private insurance were no more likely than Medicaid recipients to initiate care in the first or second trimester.

Discussion

Like previous investigators, we found that lack of health insurance is a significant impediment to the timely initiation of prenatal care; therefore, we concur with those who call for major reforms in the financing of maternity services to greatly broaden and expedite eligibility for public health insurance and free prenatal care. Our results also support findings of previous studies on the relationship between substance abuse and the receipt of prenatal care. In our study, virtually all of the women who had had substance abuse problems during pregnancy received prenatal care late in pregnancy or not at all. Because only women with severe dependency problems are likely to admit they are substance abusers or to be identified as such in medical records, the actual percentage of such women who receive late prenatal care or no care is likely to be higher.

There are several reasons for this pattern. First, the addiction itself may distort women's perceptions of the importance of health care during pregnancy and their motivation to seek care. Second, the association between substance abuse and delayed prenatal care may in fact be spurious, caused by the relationship of these two variables to other socioeconomic or psychological factors. For example, the stresses of poverty may lead women to abuse drugs or alcohol and to postpone obtaining health care. Finally, as suggested by Sarah Brown, pregnant women who use drugs may be worried about the legal ramifications of detection, such as the possibility of incarceration or forcible removal of their children.⁹

Like Joan Cooney, we found that the log odds of late or no prenatal care were higher for Hispanic women than for black women.¹⁰ However, the majority of the Hispanic respondents in both Cooney's study and ours were Puerto Rican women in New York City, and there is considerable variation in access to and use of health care services among the various Spanish-speaking groups in the United States. A national summary of vital statistics data from 23 reporting states for the same year as our study shows that Puerto Rican women were the most likely to receive late or no prenatal care (17.4 percent), followed by Mexican women (13.4 percent) and non-Hispanic blacks (11.3 percent).¹¹ However, the rate for Cuban women was essentially the same as that for non-Hispanic whites (4.1 percent and 4.2 percent, respectively). The distinguishing factor is socioeconomic

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Patterns of Adult Male Coresidence Among Young Children of Adolescent Mothers

By David J. Eggebeen, Lisa J. Crockett and Alan J. Hawkins

Summary

This article uses data from the National Longitudinal Survey of Youth to examine the coresidence patterns of children and adult males during the first three years of a child's life, with special attention to the children of adolescent mothers. Overall, the most common experience was for the children to have an adult male present over the full period. However, there were differences by race and the mother's age when she gave birth. For example, 83 percent of white children and 47 percent of black children born to mothers aged 20 or older lived with an adult male during their entire early childhood, while three quarters of white children and fewer than one-third of black children born to mothers younger than 18 had a male present in their household over their first three years. Among both races, children of older mothers were significantly more likely than others to be born into a household where an adult male was present. The stability of male coresidence varied significantly by the mother's age among white children, but not among blacks. Overall, black children experienced more changes in male coresidence than whites. Finally, the likelihood that the adult male would be married to the mother was positively associated with white race and the age of the mother when she gave birth.

Introduction

The detrimental impact of adolescent childbearing on the mother's later development and life chances has been well

A significant minority of children of black teenage mothers live with their grandfather, and this arrangement is stable. In contrast, living with the grandfather is a highly unstable living arrangement for children of white teenage mothers.

documented. Compared with women who postpone childbearing, early childbearers tend to have lower educational and occupational attainment, experience more marital instability and rely more on welfare.¹ Although the effects on children of being born to teenage mothers are generally presumed to be negative, comparatively little is known about the consequences over these children's life course.² However, poor cognitive and intellectual performance (relative to that of children of older mothers) has been identified as early as the preschool years and is most pronounced among boys.³ Children of adolescent mothers also appear to be at greater risk of behavioral problems.⁴ These effects appear to be stronger for boys, for blacks and for school-age children.⁵ As adolescents, children of teenage mothers show even greater disadvantages, exhibiting high rates of academic failure, delinquency, early sexual initiation and substance abuse.⁶

One important factor that may protect against some of the problems associated with being born to a teenager is the presence of a child's father or another adult male. A resident adult male may provide increased income and other resources for the child's family. In addition, research suggests that contact with adult males promotes children's cognitive and social development in general.⁷ Among infants, mental test scores are positively associated with the extent of contact with the father.⁸ For older children, paternal participation in the family is positively associated with preschool cognitive performance, especially in boys. Similar findings have been

reported specifically for the children of teenage parents.⁹

The presence of a father in the home may also promote positive social development. Among the preschool children of teenage parents, those from homes without fathers show poorer social adjustment and more behavioral problems than those having a father present.¹⁰ Research on older children indicates a relationship between the absence of fathers and delinquency.¹¹ Some studies have found that the presence of stepfathers at least partly compensates for a missing biological father.¹² In other cases, stepfathers do not appear to make up for the loss.¹³ Of course, the impact of a resident adult male may not always be positive; the child-abuse literature suggests that the presence of an adult male may sometimes prove to be detrimental to a child's well-being.¹⁴

Despite the potential significance of a male's presence for the well-being of high-risk children, we know little about children's patterns of coresidence with adult males. Most attempts to document such patterns have focused on the consequences of divorce and have not explicitly compared children of early childbearers with those of older parents.¹⁵ In addition, children's living experiences with males other than their biological fathers have been virtually ignored.

The work of Frank F. Furstenberg, Jr., and colleagues¹⁶ is one exception to this norm. Their data show a tremendous diversity in the experience of male coresidence among urban black children. Only a small proportion of the children they studied spent their entire childhood with-

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out ever living with a potential father figure. Yet, in contrast, just 13 percent spent their entire childhood with an adult male present in the home; the rest spent varying amounts of time living with their mother only, with their mother and stepfather or with their mother and her partner or another adult male. However, the extent to which these findings are representative of children in other populations is unknown.

In this article, we will address some of the neglected aspects of male coresidence by using data from the mother-child file of the National Longitudinal Survey of Youth (NLSY) to compare the experiences among children born to teenagers with those of similar children born to older mothers. First, we describe the children's experience in detail (focusing on the duration and timing of coresidence, family stability, and the first coresiding man's relationship to the mother). Second, we document how contact with adult males varies by race and by the mother's age at the birth of the child.

Data and Methodology

The NLSY, an ongoing survey, has been conducted annually since 1979 by the Center for Human Resource Research (CHRR) at Ohio State University. The national probability sample of 12,686 respondents aged 14-21 in January 1979 contains an oversampling of blacks, Hispanics and low-income whites. After the 1986 survey round, the CHRR issued data on the cognitive, socioemotional and physical health of the children born to the women surveyed,¹⁷ in addition to the data on the mothers collected over eight years.

This survey is ideal for studying early childbearing, since it documents the continuing experience of a nationally representative sample of women. However, this sample of children is representative only of those children born during approximately the first third of the childbearing years of a contemporary cohort of American women.

We focus on white and black children only; the small sample size of Hispanics prevented their inclusion in the analysis. In addition, we examine the first three years of life among only those children aged 3-6 at the 1986 interview. Three years

represents the shortest reasonable time to track patterns of adult male coresidence for a child. Also, given the 1986 cutoff date, we can obtain information on the mother's household and living arrangements before the birth only for children aged up to six years. The final sample size consisted of 1,545 children (944 whites and 601 blacks).

The data on household and living arrangements collected in each survey round provide the necessary information to assess the child's access to an adult male. These data measure four critical dimensions of exposure to an adult male in early childhood: the duration of coresidence, the timing of coresidence, the stability of the living situation and the man's relationship to the child and the mother.

The effect of an adult male is most obviously conditioned by the amount of time a child spends with him. We measured the proportion of a child's early life spent with a coresident male by counting the number of annual interviews conducted while an adult male, regardless of his relationship, was residing in the child's home. Although the data may overestimate exposure to a male coresident (e.g., a male may be absent for several months between interviews), the number of interviews for which he was present (out of a possible total of four) does give some indication of the duration of the child's contact with him.

An adult male's timing of entrance into a child's life has important implications for the child. In many cases, a man (presumably the child's father) resided in the household before the child was born. However, an adult male comes into the lives of other children much later on. For those children who resided with a male at some point in their first three years of life, we used three categories to designate the timing of his arrival into the household: before the birth, concurrent with the birth (that is, he was present at the time of the first interview after the child was born but not before) and after the child was one year old.

We measured how stable male coresidence was for the child by counting the times that a primary male—the highest-order male in our importance hierarchy—arrived or left the child's home between interviews, ignoring those times occurring before or concurrent with the birth of the child. We assume that in these cases, the entry or exit of a male is not experienced as a transition from the child's perspective.

Finally, we hypothesize that the significance of the child's relationship with a coresident male varies, in part, with the nature of the tie between them. Although

the data do not allow us to determine a male's biological ties to a child, we can classify a coresident male by his social relationship to the child's mother. For simplification, we categorized the potentially complex family arrangements (i.e., multiple adult males in the home at the same time) into a hierarchy of importance to the child, and at each interview, we checked for the presence of the highest-order relationship. Our importance hierarchy was structured in the following descending order: the mother's spouse,* the mother's partner, her father, and any other adult male (such as a brother). We checked at each interview round for any changes in the identity of this primary male. Some children were classified as having no adult male present in the home during the first three years of life.

The central purpose of our study is to examine the ways in which exposure to adult males among children of early childbearers differs from that of children born to older mothers. Since studies show that the effect of this exposure on children varies according to the age of the young mother,¹⁸ we used three categories for the mother's age at the time of birth: younger than 18, aged 18-19 and aged 20 and older. We also anticipated significant racial variations in male coresidence patterns, given the marked differences between blacks and whites in family formation patterns.¹⁹

Results

The top panel of Table 1 displays the percentage distribution of children by the number of interviews at which time an adult male was living in the home. In general, the younger the mother, the less likely it was that the child had a coresident male at all four interviews, although these differences are statistically significant for blacks only (chi square=17.38, df=8, $p<.05$). Among blacks, the major difference appears to lie between the children of the youngest mothers and the children of the intermediate group. Racial differences are marked: Some 81 percent of white children lived with an adult male throughout the first three years of life, compared with just 45 percent of black children. There was also a large racial difference in the proportion who had no coresident male at the time of any of the annual interviews—two percent of white children, compared with 17 percent of blacks.

Among whites, substantial differences in the timing of a man's arrival into the household exist according to the mother's age, as the second panel of Table 1 shows

*Since the mother's partner can change his relationship to the child by marrying the mother, we initially specified this possibility as a separate category from either spouse or partner. However, since only a few mothers in the sample married a partner within the first three years of the child's life, we decided not to create a separate category and classified these men as spouses.

(chi square=62.82, df=6, $p<.001$). The older the mother, the more likely that the child was born into a family with a male already present. In fact, a large majority—82 percent—of children born to mothers 20 or older were born into such families. However, when the proportion who experienced the arrival of a male concurrent with birth is taken into consideration, more than 90 percent of the children in each of the mothers' age-groups had a male coresident at some point in the first year.

The experience of black children is quite distinct from that of whites. Only one-half of black children were born into a family with a male already present, compared with more than three-fourths of whites. Of course, this difference is exaggerated by the smaller proportion of blacks ever experiencing coresidence with an adult male during their early childhood. However, even when this disproportion is taken into account, the large gap between whites and blacks remains. In addition, among blacks, the mother's age appears to have less of an effect on the timing of a man's arrival into a household (chi square=13.52, df=6, $p<.05$). For example, compared with teenagers, older mothers were somewhat more likely to have resided with a man before they gave birth. Also, 60 percent of the children born to the youngest mothers had an adult male present in the household at some point in their first year, a proportion only slightly lower than that for the children of the oldest mothers (67 percent).

As mentioned earlier, we measured the stability of male coresidence by tracking the number of times a primary male moved into or out of each child's household from birth through age three.* Thus, if one male left and another entered the household, a child experienced two transitions. The table presents the percentage distribution of children who had lived with at least one male by the number of transitions occurring over their first three years. Among white children, significant differences emerge by the mother's age (chi square=39.05, df=6, $p<.001$). Some 45 percent of children born to the youngest mothers had a stable living arrangement in their first three years, compared with 79 percent of those born to the oldest mothers. Further, 18 percent of the children of the youngest mothers experienced three or more male transitions, compared with only three percent of children of the oldest mothers. The proportion for the children born to the 18–19-year-olds lies between these two extremes.

Black children experienced greater instability than whites in adult male core-

Table 1. Percentage distribution of children, by measures of male coresidence, according to race and mother's age at birth

Measure	White				Black			
	Total (N=944)	<18 (N=80)	18–19 (N=212)	≥20 (N=652)	Total (N=601)	<18 (N=89)	18–19 (N=181)	≥20 (N=331)
No. of interviews								
0	2.0	2.2	1.9	2.0	17.3	17.3	16.4	17.8
1	2.5	5.5	4.3	1.7	13.5	15.3	13.7	12.9
2	4.8	4.9	5.7	4.5	12.0	22.0	9.4	10.7
3	9.5	12.2	10.8	8.8	12.6	13.2	15.3	11.2
4	81.2	75.2	77.2	82.9	44.7	32.3	45.3	47.4
Timing of male's arrival								
Before birth	76.1	47.4	66.4	81.7	50.2	43.1	45.0	54.4
Concurrent with birth	18.0	44.1	27.5	12.6	15.3	16.7	19.5	12.9
After birth	4.0	6.3	4.2	3.6	17.2	22.9	19.2	14.8
No male	2.0	2.2	1.9	2.0	17.3	17.3	16.4	17.8
No. of transitions*								
0	73.2	45.2	63.2	78.9	39.8	32.2	35.4	43.9
1	8.3	14.0	10.1	7.3	28.3	35.9	29.7	25.7
2	12.3	22.9	15.3	10.4	22.5	24.4	23.9	21.3
≥3	6.1	18.0	11.4	3.4	9.4	7.5	11.1	9.0
Male's relation to mother								
Spouse	86.5	68.8	76.5	91.1	34.7	11.8	25.7	44.7
Partner	2.8	1.3	3.2	2.8	8.9	8.9	8.2	9.3
Father	6.4	23.7	12.0	3.0	24.4	35.1	31.8	18.2
Other	2.3	4.0	6.5	1.0	14.7	27.0	18.0	10.1
No Male	2.0	2.2	1.9	2.0	17.3	17.3	16.4	17.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

*Limited to children who had had a coresident adult male by age three: 909 whites (74 of whom were born to mothers younger than age 18; 207 to mothers 18–19; and 628 to mothers 20 or older) and 496 blacks (73 of whom were born to mothers under 18; 153 to mothers 18–19; and 270 to mothers 20 or older).

Notes: Percentages are weighted by the child's sample distribution; Ns are unweighted.

Source: National Longitudinal Survey of Youth, 1986 Mother-Child Supplement data tape, Center for Human Research, Ohio State University, Columbus.

sidence. Overall, almost 60 percent of black children in our sample experienced at least one transition in their first three years, including 32 percent who experienced two or more. Differences by the mother's age are less striking for blacks than for whites and are not statistically significant (chi square=8.55, df=6). Even though the children born to the oldest mothers had the most stable early home life, their experience was not substantially different from that of children born to teenagers. Moreover, there was only a slight difference between the children of the youngest teenagers and those of the older teenagers in the proportion who lived with the same adult male throughout the three-year period.

The table also shows the percentage distribution of children according to the identity of the first coresident male. For most of the sample, information on the first coresident male is sufficient, since 80 percent lived with only one adult male throughout their first three years.

Among white children, the mother's

spouse was by far the most common coresident male (87 percent of the total). However, the mother's age clearly has an impact on the identity of the adult coresident male (chi square=67.83, df=8, $p<.001$). Among the children of the youngest mothers, 24 percent first lived with their grandfather and 69 percent lived with their mother's husband (presumably their biological father). Only four percent lived with some other male. In contrast, for more than 91 percent of children of older mothers, the first man they lived with was their mother's spouse.

The situation among blacks could hardly have been more different. Only 35 percent of these children first lived with their mother's spouse. Large and statistically significant differences exist by mother's age (chi square=55.27, df=8, $p<.001$). Only 12 percent of children of the youngest

*We excluded the entrance of a male into the household if it occurred before the child's birth or between the last interview prior to the child's birth and the first interview afterward.

mothers lived with their mother's spouse while the proportions among the children of 18-19-year-old mothers and of those aged 20 and over were 26 percent and 45 percent, respectively. Even the proportion among the oldest black mothers, however, is less than half that among comparable whites. The children of teenage mothers were most likely to first live with their grandfather; the next most likely men to be present were other males. Overall, the likelihood that the first coresident male will be the mother's husband is strongly linked to the mother's age among both races. Nonetheless, the likelihood that the first coresident male will be married to the child's mother, regardless of her age at the child's birth, is much lower among blacks than among whites.

We combined all of the measures of male coresidence to determine how many young children experienced a "traditional" life course (i.e., being born into a two-parent family that remains intact over the first three years of the child's life, data not shown). For whites, we found that the mother's age had a large impact on the probability of following the traditional pattern, which characterized 70 percent of the children of the oldest mothers, 48 percent of those born to 18-19-year-olds and 32 percent of children of the youngest mothers.

The living patterns of black children are more spread out over the possible combinations of arrangements and stand out in sharp contrast to those of white children. The modal pattern for the black children studied, however, is to have no adult male present in the home during their first three years of life. While the traditional living situation is a close second, its likelihood varies dramatically by mother's age at the child's birth: Only three percent of children born to the youngest mothers followed a traditional early life course, compared with 26 percent of those born to the oldest mothers.

Discussion

For both black and white children in the NLSY sample, the age of the mother clearly affected their early experience with adult males. Children of the younger mothers spent a somewhat smaller proportion of their first three years with a coresident male and experienced greater instability in the home (i.e., more transitions). Furthermore, for younger mothers, an adult male was less likely to be living in the household prior to the child's birth; however, if men who arrived in the household concurrent with the birth are included, the

differences related to mother's age are greatly reduced.

To the extent that adult males contribute to the young child's well-being, either directly or indirectly through support for the mother, it can be argued that the children of younger mothers are at greater risk of behavioral and other problems than are those of older mothers. The problems of children born to adolescent mothers may also be partially attributable to these patterns of limited contact with coresident adult males.

The identity of the coresident male also varied by the age of the mother. For children born to the younger mothers, the male was far less likely to be the mother's spouse. If we assume that marriage signifies a greater commitment to the woman and her child (and, in most cases, to fatherhood as well), these children may again be at a disadvantage.

Finally, children born to the younger mothers were the least likely to spend their first three years in a stable, two-parent family. The importance of this differential has been suggested by research showing that poor, urban blacks raised in two-parent families demonstrated higher levels of social adjustment than children in other family structures.²⁰

The relatively low proportion of children of teenage mothers reared in stable, two-parent families reflects the greater marital instability among adolescents reported in other research.²¹ The variability in male coresidence patterns, especially among blacks, resembles the broad array of family configurations observed by Stepard G. Kellam and his colleagues in a black urban community.²² The present data, however, highlight the changes in family configuration that children experience very early in life.

Children's experience with coresident adult males also differed markedly by race. Compared with whites, black children spent a smaller proportion of their early lives with an adult male present, experienced greater instability in these living situations, were less likely to have been born into a household with a male already present and were significantly less likely to have spent their first years with married parents. These findings are largely consistent with the literature on black-white differences in patterns of family formation.²³ The relative likelihood that black children will spend their early lives without a male present has been associated with poorer child development outcomes in cases where the mothers live apart from other adults and viable support networks.²⁴

The extent to which black families are more involved than white families in kin support networks remains a matter of debate. Evidence from ethnographic studies suggests that such networks are particularly meaningful for blacks; the strength of intergenerational ties makes the higher incidence of single parenthood among blacks potentially less problematic than it is for whites.²⁵ However, several studies using large, representative survey samples have found that blacks have no advantage over whites in the utilization of kin networks for support, once family structure is taken into account.²⁶

Our finding that the mother's age had less impact on male coresidence among blacks than among whites may be related to these overall racial differences in family structure. For example, the difference across the maternal age categories in the proportion of households having a male present prior to the birth was 35 percentage points among whites but only 10 points among blacks. Similarly, very high instability in male coresidence was related to the mother's age for whites but not for blacks. A major reason for this finding is that a significant minority of children of black teenage mothers live with their grandfather, and this arrangement is stable for the young women and their children. In contrast, living with the grandfather is a highly unstable living arrangement for children of white teenage mothers. These findings are consistent with the work of several researchers showing that blacks are more likely than whites to reside in extended households.²⁷

Now that we have documented the different patterns of adult male coresidence among black and white children born to younger versus older mothers, the next step is to examine the impact of these patterns on the children's well-being. Prior research suggests that adult males (especially fathers) can have a positive impact on children's cognitive and social functioning.²⁸ Clearly, determining which features of male coresidence are associated with positive consequences for children should be an important goal of future research. In addition, the importance of these coresidence patterns needs to be assessed in light of the broader patterns of children's contact with males. Work by Frank L. Mott using the same NLSY data suggests that a substantial proportion of children (especially blacks) who are not living with their fathers do have regular contact with them.²⁹ Whether this access to absent fathers makes a difference, however, remains to be explored.

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Special Report

Funding Restrictions on Fetal Research: The Implications for Science and Health

By Patricia Donovan

Scientists throughout the world are currently studying human sperm, eggs, embryos and fetal tissue to learn how genetic diseases begin, to help couples overcome infertility problems and to find cures for degenerative diseases and disorders. For example, Australian researchers have recently discovered that infertile men can father children if their sperm is injected under the shell of the egg during in vitro fertilization (IVF),¹ the process by which an egg is fertilized outside a woman's body in a culture medium and the embryo is then transferred to the uterus to develop. British scientists are working to improve the effectiveness of IVF, which results in a live birth only once in every 10 pregnancy attempts.²

British and Australian investigators are also attempting to detect genetic and chromosomal abnormalities in embryos less than two weeks old; if the attempts are successful, couples at risk of transmitting hereditary defects could use IVF to avoid bearing afflicted children without having to resort to abortion. Along the same lines, a group of British scientists recently identified the sex of three-day-old embryos, thus permitting couples who are known carriers of genetic diseases that affect only males, such as hemophilia and Duchenne's muscular dystrophy, to use IVF to ensure that only female embryos are transferred to the woman's uterus.³

Attaining the ability to identify and study genetic diseases from the earliest stages of cell development and organ differentiation is a critical step toward the long-range goal of curing abnormalities—or at least ameliorating their effects—prior to birth. Already, French researchers are

beginning to treat fetuses suffering from inherited immune deficiency and hemoglobin disorders.⁴ Swedish scientists are leading the way in the use of fetal nerve tissue transplants to reverse the effects of Parkinson's disease, a common degenerative brain disease.⁵ In China, the Soviet Union and other countries, scientists are attempting to restore diabetics' insulin production by implanting fetal pancreas tissue.⁶

As these examples make clear, biomedical research linked to the human fetus and embryo holds great promise for the treatment and prevention of widespread disabling and life-threatening diseases. At least a half million people in the United States alone suffer from Parkinson's disease and almost 50,000 new cases are diagnosed each year.⁷ Some 12 million Americans have diabetes,⁸ which is the nation's third most common killer, after cardiovascular disease and cancer.⁹ Genetic disorders also take a heavy toll: Almost one-quarter of deaths among U.S. newborns result from genetic or chromosomal causes.¹⁰ Infertility, too, is widespread: Almost 2.4 million married couples in the United States are infertile;¹¹ for many, IVF is their last hope of having a child of their own.

Despite the potential of research in these areas to alleviate suffering and reduce mortality, U.S. government policy has left American scientists standing on the sidelines in the international quest to turn this potential into reality. For over a decade, the U.S. government, the principal source of support for basic biomedical research in this country, has severely restricted its funding of research involving human fetuses and embryos—not because of the conviction that such studies lack scientific merit, but because of the politics of abortion. In response to opposition from anti-abortion groups, which oppose such research on the grounds that it will lead to

more abortions and undermine respect for human life, the government has refused since 1979 to fund any studies of human IVF and early embryonic development and has strictly limited its support of research projects involving live fetuses—regardless of the potential benefits. For the past two years, the government has also barred any funding of research involving the transplantation of human fetal tissue into people when it is obtained from induced abortions, the source of virtually all such tissue.*

While it is difficult to quantify the impact of these restrictions, recent interviews with more than 30 reproductive biologists, geneticists, embryologists, neurologists, neuroscientists, pharmacologists, ethicists and other informed observers indicate that this impeding of research may be the most far-reaching, if least recognized, consequence of the ongoing controversy over abortion. "The abortion debate has influenced the gathering of new information on human disease," notes geneticist Thomas Caskey of the Baylor College of Medicine. Others feel even more strongly: John Fletcher, director of the Center for Biomedical Ethics at the University of Virginia and former chief ethicist at the National Institutes of Health (NIH), asserts that the government's funding policies amount to the "ideological suppression of science."

The federal government and the private sector each spends billions of dollars annually on health-related research and development, but investigators say that relatively little private money is available for basic research. "Trying to conduct basic research without government support is

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*Tissue from induced abortions is preferred over tissue from spontaneous abortions because it is easier to obtain and less likely to be defective. The moratorium does not preclude funding of research on transplantation of human fetal tissue into animals.

like [trying to] build roads without a road tax," declares Austin Brewin, vice president for medical affairs at Hana Biologics, a private research and development company. In addition, the government's policies strongly influence the willingness of private donors to support research studies.

"In all recent biomedical research, the federal government has led the way toward breakthroughs," observes Representative Henry Waxman (D-Calif.), chairman of the House Subcommittee on Health and the Environment, which held hearings on the impact of the government's ban on funding fetal tissue transplant research. "If... it slams the door shut, we can expect researchers to abandon promising leads, to go into other fields and even to go to other countries."¹²

Researchers say that this is already occurring in areas involving study of the fetus, fetal tissue transplants and embryonic development, slowing advances in these fields. Moreover, investigators add, when breakthroughs are made, they will be made in other countries—often, ironically, with the help of technologies developed with federal assistance in the United States. With its current funding restrictions, maintains Kenneth J. Ryan, former chairman of the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, the government "cedes to other countries and societies the cutting edge of science and medicine, and requires that we ultimately import another commodity that has heretofore been one of our greatest exports—scientific and medical progress."¹³

Background

Research involving live fetuses and fetal tissue has been conducted in this country since the 1930s. It provoked little or no controversy until the U.S. Supreme Court legalized abortion in 1973, whereupon right-to-life groups quickly sought to prohibit such research—a move one analyst described as "perhaps... inevitable [because] it fit in with the antiabortionists' position that the fetus was a person from the moment of conception with a right to life... and the issue promised to provide plenty of the kind of dramatic examples that congressmen seek when arguing for a measure."¹⁴ In an impassioned speech on the floor of the House of Representatives in the spring of 1973, Representative Angelo D. Roncallo (R-N.Y.) defended his bill to prohibit fetal research by declaring, "this is not an antiabortion bill. We are not concerned here with how this live human

fetus gets to the operating table. All we say is, if I cannot live, let me die in peace. Do not cut tissue samples while I still have a heartbeat; do not stick tubes in me; do not artificially prolong my life when the decision has already been made that I cannot survive just to watch what happens, only to shut off the machine when we are done and watch me die."¹⁵

The sudden politicizing of fetal research coincided with a growing debate in Congress over the need to protect human research subjects from abuse. In July 1974, Congress passed the National Research Act,¹⁶ which established a National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research to review all federally supported research using human subjects. Pending the commission's recommendations on research involving fetuses, Congress imposed a moratorium on all federal funding of research on living fetuses, before or after abortion, except to ensure the survival of the affected fetus.

The moratorium remained in effect until May 1975. In August of that year, the Department of Health, Education and Welfare (which subsequently became the Department of Health and Human Services [DHHS]) issued regulations governing research on fetuses and pregnant women, based on the commission's recommendations. The regulations, which are still in effect, specify that the federal government may fund such research only if all necessary studies on animals and nonpregnant women have been conducted; if all fetuses (defined as the product of conception from the time of implantation) are treated the same, regardless of whether an abortion is planned; if the study is intended to meet the needs of the individual fetus or woman; and if it entails no more than a "minimal risk" to the fetus. However, the secretary of the DHHS has the authority to waive the minimal-risk standard on a case-by-case basis if he concludes that the research would provide important scientific knowledge, if the potential benefits to the fetus outweigh the risks and if the research proposal has been reviewed and deemed acceptable by the department's Ethics Advisory Board (EAB).¹⁷ The Department of Health, Education and Welfare did not issue any substantive regulations in 1975 on IVF research, but the fetal research regulations explicitly require EAB review prior to any federal funding of research on human IVF or embryos.¹⁸ Regulation of research on dead fetuses and fetal tissue, however, is left to the individual states.¹⁹

In 1985, Congress codified some of the

fetal research regulations, including the requirement that all fetuses be treated equally and the prohibition on funding for research posing more than a minimal risk to the fetus. Congress also placed a three-year moratorium on the DHHS secretary's authority to waive the minimum-risk standard, thereby halting any federally funded research for which a waiver might have been needed.²⁰ In 1988, that moratorium was extended for another two years.²¹

Even if the waiver of the risk standard were in effect, however, the government would be barred from funding any IVF or embryo research—as well as most invasive research involving live fetuses—because the EAB was dissolved late in the Carter administration and has never been rechartered, despite "the repeated requests of NIH scientists, [Public Health Service] officials and the scientific community."²² In effect, therefore, the government has imposed an unofficial moratorium on these areas of research.

The moratorium on fetal tissue transplantation research, on the other hand, is official and explicit. In March 1988, after a group of NIH scientists received the agency's approval to transplant fetal nerve tissue into patients with Parkinson's disease, DHHS Assistant Secretary for Health Robert Windom temporarily halted all federal support of research involving transplantation of human tissue from induced abortions. Windom directed the NIH to convene an outside advisory panel to examine the ethical, legal and scientific issues raised by fetal transplantation research, specifically whether the mere existence of such research would encourage some women to have abortions.

Following public hearings at which numerous scientists, legal experts, ethicists and abortion opponents testified, the 21-member Human Fetal Tissue Transplantation Research Panel concluded, by a vote of 18 to three, that the use of such tissue in transplantation research is "acceptable public policy."²³ By an even wider 19-to-one margin (one panel member abstained), the panel said that a review of more than 30 years of published research on fetal tissue had produced "no evidence that use of fetal tissue for research has had a material effect on the reasons for seeking an abortion in the past."²⁴ Nevertheless, the panel recommended certain safeguards to minimize the possibility that such research would encourage women to have abor-

¹⁹Minimal risk requires that the anticipated risks be no greater than those encountered in daily life or in routine medical examinations.

tions: The decision to have an abortion and consent to the procedure should precede any discussion of the possible research use of the fetal tissue as well as any consent to such use, and the pregnant woman should be prohibited from designating the recipient of the tissue implant.²⁵

The panel's report was unanimously accepted by the NIH director's standing advisory committee, which itself unanimously voted to recommend that the funding moratorium be lifted. The reports and recommendations were forwarded to the DHHS in December 1988, but the Reagan administration took no action before the end of its term. It was not until nearly a year into the Bush administration that DHHS Secretary Louis Sullivan announced that he was extending the moratorium indefinitely because of "the likelihood that permitting [human fetal tissue transplantation research] will increase the incidence of abortion across the country." If research proves that transplants are successful in treating certain diseases, he said, "a demand for aborted fetuses could be created. Pressure would then be created to produce more fetal tissue."^{26*}

The government spends more than \$16 million annually to study fetuses, fetal tissue and infertility.²⁷ Nevertheless, there is wide agreement among scientists in these fields that restrictions on the types of studies that can be funded significantly affect their ability to conduct research on IVF, early embryonic development, live fetuses (including in utero surgery to correct fetal abnormalities) and fetal tissue implants.

IVF and Embryo Research

Since the birth in July 1978 of Louise Brown, the first child conceived through IVF, the technique has become an established method of treating certain types of infertility. Some 12,000 children worldwide have been born through IVF;²⁸ yet the odds of achieving a live birth remain disappointingly low: Nearly half of IVF

centers in the United States have failed to achieve a live birth,²⁹ and only nine percent of women entering treatment attain a live birth.³⁰ The chief reason, according to experts, is the lack of knowledge about basic reproductive biology—information that researchers say they are effectively prevented from gathering because of the de facto moratorium on government funding for IVF research.

Doctors do not know, for example, how to differentiate viable and nonviable embryos. "Right now, doctors pick embryos that look good," explains Gary B. Ellis, director of the Institute of Medicine's Division of Health Promotion and Disease Prevention and project director of a 1988 study of infertility by the Office of Technology Assessment. "I don't mean to undervalue [physicians'] clinical judgment, but we desperately need a better predictor of embryonic viability. Are the best . . . secreting some factor . . . that could be measured?"

Scientists also do not know the optimum number of sperm to expose an egg to for fertilization to be achieved, how many embryos to transfer to the uterus, what factors control the maturation of the egg or the best culture medium in which to fertilize and nurture human eggs. The latter question is being studied by Oliver Lowry of Washington University, who has a foundation grant to conduct IVF research.† Up to now, Lowry reports, incubation methods have been based on studies of mice and rabbits, species that are so inbred that it is hard to extrapolate the results to humans. "Human eggs might require a different medium," says Lowry. "We don't know." The immediate benefits of such a discovery would be a better way to culture human eggs and, it is hoped, a better success rate for IVF; ultimately such work, according to Lowry, could enhance scientists' understanding of spontaneous abortion.

Scientists would also like to be able to safely freeze and then thaw unfertilized eggs, as they can do with embryos and sperm (which have chromosomes less fragile and susceptible to damage than eggs). In Australia, scientists are devising ways to freeze immature eggs, which appear to withstand the freezing process better than mature eggs. According to Alan Trounson, director of the Center for Early Human Development, a large IVF and embryo research center in Australia, the ability to freeze large numbers of immature eggs and then thaw and fertilize a few at a time would help doctors avoid one of the "major difficulties" with IVF—multiple

births resulting from the current practice of collecting and fertilizing many mature eggs and transferring several embryos to the uterus at once.

The risk of multiple births, says Trounson, often requires selective abortion, which "is not a good method of managing IVF." In addition, points out Gary D. Hodgen, scientific director of the Jones Institute for Reproductive Medicine in Norfolk, Virginia, developing the technology for freezing eggs for later use might avoid the objections of right-to-life groups, because "the unfertilized egg is not invested with the same value as an embryo."

Before its dissolution in 1979, the EAB issued a report in which it declared that it was ethically acceptable to conduct, and for the government to fund, research on human IVF and on embryos up to 14 days after fertilization.³¹ (These embryos are often called "preimplantation embryos" because 14 days is roughly the time it takes for a newly fertilized egg to complete the process of implanting in the uterus, which must occur before the embryo begins to develop.³²) Study of early embryonic cells is essential to learning how genetic disease occurs and how it can be treated before birth, geneticists say.

"The across-the-board ban on the use of human materials to sort out human disease [amounts to] carrying out research with one hand tied behind your back," explains Baylor's Caskey. "We must learn how and when disease-causing genes 'turn on and off' as the embryo develops."³³ Ezra C. Davidson, chairman of the department of obstetrics and gynecology at the Charles R. Drew University of Medicine and Science, and the only researcher to receive a waiver of the minimal risk standard for a fetal research project, agrees. "We have to know about the fetus in order to understand what we could do to help." Currently, he adds, there is "a dearth of information [about] biochemical, hormonal and enzymatic changes in [embryonic] cells and organ function."

The ability to diagnose genetic disease in preimplantation embryos would also help couples who must either risk having children with inherited abnormalities or abort defective fetuses; by using IVF, only unaffected embryos could be transferred for implantation. Yet according to Lowry, virtually no embryo research is being conducted in the United States; in Great Britain, by contrast, at least 10 centers are working to detect genetic diseases—such as cystic fibrosis and Huntington's chorea—in preimplantation embryos.

*In August 1990, Representative Henry A. Waxman introduced legislation, H.R. 5456, that would give NIH explicit permanent authority to conduct and fund fetal tissue transplantation research, provided that the safeguards recommended by the NIH panel are implemented. The secretary of the DHHS would be prohibited from refusing to fund any type of scientifically valid research because of ethical objections unless a special panel agreed that the research was unethical.

†In April 1988, James Wyngaarden, director of the NIH, urged the DHHS to overcome obstacles that prohibit IVF funding in order to fund Lowry's project, which was awaiting NIH approval. No action was ever taken on Wyngaarden's request. (See: "Infertility in America . . ." 1989, reference 22, p. 15.)

Fetal Tissue Transplantation

Fetal tissue has been an irreplaceable resource in biomedical research in this country as well as abroad. It is used to identify and test the efficacy of vaccines and to examine the toxicity of drugs used by pregnant women. Vaccines for polio, measles, rubella and Rh disease were developed through the use of fetal tissue or cell lines derived from fetal tissue. The government has long supported such work; in FY 1989, it spent almost \$3.4 million on research projects that used fetal tissue.³⁴

Despite the current controversy over fetal tissue transplants, such research is not new. Since the 1930s, scientists in this country and elsewhere have grafted fetal liver, nerve, thymus and pancreas tissue into children and adults in efforts to reverse various neurological disorders, spinal cord injuries, diabetes, immune deficiencies, cancers and life-threatening blood diseases.³⁵ At best, most of these efforts have produced only transient improvement in the patient's condition, although since the late 1960s, fetal thymus implants have been the accepted means of treating a rare and fatal congenital disease known as DiGeorge's syndrome, in which an improperly developed or missing thymus results in the lack of an immune system. When fetal thymus tissue is transplanted into an infant suffering from DiGeorge's, it takes over the functions of the recipient's missing or nonfunctioning organ.

Fetal tissue's unique ability to grow quickly after implantation, to adapt to its new environment and to assume the functions of the recipient's diseased or damaged tissue makes tissue transplants a promising therapy for a wide range of conditions. In addition, fetal tissue is much less likely than tissue from adults and children to trigger an immune response in recipients. It is also more resistant than older tissue to a lack of oxygen and can often be injected rather than implanted surgically.³⁶

Studies with animals suggest that fetal tissue does have the potential to cure a substantial number of debilitating and often lethal diseases. The most promising work with humans has been on people suffering from Parkinson's disease, which destroys the part of the brain where a chemical called dopamine is produced. A lack of dopamine, which controls normal muscle movements, leads to tremors and muscular rigidity. In the early stages of the disease, patients can be given the drug L-dopa, which the brain converts to dopamine; eventually, however, the drug loses its effect, and the patient becomes com-

pletely incapacitated. Swedish scientists have been in the forefront of the efforts to treat Parkinson's disease with fetal nerve tissue. After successful efforts to reverse the symptoms in rats in the mid-1980s, fetal nerve cells were implanted in two women; in neither case, however, did the condition improve appreciably. But in February 1990, a team led by Dr. Ollie Lindvall of the University Hospital in Lund, Sweden, reported dramatic improvement in the condition of a 49-year-old man with severe Parkinson's six months after he received implants of fetal brain cells.³⁷ Three months later, a team of privately supported American researchers headed by Curt Freed of the University of Colorado Health Sciences Center reported encouraging improvement in a Parkinson's patient 12 months after a fetal tissue transplant.³⁸

These reports have generated widespread hope that fetal tissue transplants will prove to be an effective long-term therapy. Yet the investigators are quick to acknowledge that transplants are still experimental: The approach must be shown to be effective in more patients and a number of important issues need to be resolved, including whether the tissue will survive and function over the long term. "Results on only one patient are [simply] anecdotal," notes Barry Hoffer, professor of pharmacology at the University of Colorado and a member of the NIH transplantation research panel. "We need [large] numbers of patients to analyze [the implants' effects] statistically." Without federal support, however, those numbers are not likely to come from American studies. Currently, only two U.S. researchers—Freed, and Eugene Redmond of Yale University—appear to have private funding to conduct clinical trials with Parkinson's patients.

Substantial research has also been conducted in the United States and abroad on the ability of fetal pancreas tissue to cure insulin-dependent or juvenile-onset diabetes, which involves the destruction of the part of the pancreas, known as the islets, that produces the insulin needed to metabolize sugar. Although daily insulin injections can usually control the disease for a long time, many patients suffer serious and life-threatening complications several years after the initial diagnosis. Fetal pancreas transplants have reversed the disease in animals, but in the clinical trials conducted to date, no patients have been able to give up insulin injections for an extended period.³⁹ At the present time, there appear to be no clinical studies of

fetal pancreas implants with diabetes patients being conducted in the United States, although some have been done in the past.

Nor is any work being done in the promising area of fetal tissue implants into human fetuses in utero. Mitchell Golbus and his colleagues at the University of California at San Francisco have been able to correct certain life-threatening hemoglobin and enzyme disorders in animals before birth by implanting fetal liver tissue. In early embryonic development, liver tissue is the source of the cells that produce blood cells, a function that shifts to the bone marrow later in fetal development. "All the animal work has been done. We're at the human level now," says Golbus. "We don't know if the [therapy] will be [efficacious], but we are prohibited [by lack of funding] from finding out.... In essence, the field is closed.... The real parameters [of this therapy] will have to be worked out by the Europeans." The fetal-to-fetal therapy, which Golbus says offers the potential to correct such diseases as sickle cell anemia and Cooley's anemia (or thalassemia), which afflict thousands of newborns each year, has been tried by French researchers (the results have yet to be reported) and is being studied by doctors in England and Israel.

Research on Live Fetuses

In its 1975 report, the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research noted that research on the fetus has been undertaken to obtain "knowledge of normal fetal growth and development as a basis for understanding the abnormal; [to diagnose] fetal disease or abnormality; [to study] fetal pharmacology and the effects of chemical or other agents on the fetus, in order to develop fetal therapy; and [to develop] techniques to save the lives of ever smaller premature infants."⁴⁰ Over the years, research on live fetuses has played a crucial role in the development of ultrasonography, fetal monitoring techniques, and detection and treatment of Rh disease and fetal lung immaturity, and of technologies (including amniocentesis, chorionic villus sampling and fetoscopy) that allow for prenatal diagnosis of chromosomal, metabolic and other congenital abnormalities.

Because the risks of such studies were often uncertain, the research was frequently carried out on fetuses destined for abortion. Under the regulations, however, a research project must treat fetuses to be aborted as it would fetuses to be carried to

term, and with minimal risk to the fetus. As a result, observes University of Virginia's Fletcher, "we can do risky research for a child that we can't do for a fetus destined for abortion." Since 1979, he asserts, "not a single dime has been spent by [the NIH] on real fetal research"; rather, scientists have been focusing on data gathering and monitoring.

Indeed, because of the restriction on federal funding, private money was used to develop chorionic villus sampling, which permits prenatal detection of many abnormalities at 8-12 weeks (compared with 16-20 for amniocentesis). Private funding has also supported the efforts of pediatric surgeons Michael R. Harrison, Roy A. Filly and Golbus to find a way to repair hernias of the diaphragm, a fairly common and usually fatal congenital malformation, before birth. After more than a decade of research, the doctors reported earlier this year that a healthy baby was born seven weeks after they performed the surgery.⁴¹

In recent years, the National Institute of Child Health and Human Development (NICHD), the government agency that funds fetal research, has concentrated almost exclusively on the well-being of the woman and the fetus and has assessed complications that arise during pregnancy, "involving pregnancies that are carried to term and utilizing noninvasive techniques (such as sonography) that pose virtually no risk to the developing fetus."⁴² Of the 35 fetal research projects funded by the NICHD in FY 1989, for example, 10 were comparison studies of the risks and accuracy of chorionic villus sampling and amniocentesis, four were studies of the effects of maternal phenylalanine on pregnancy outcome, and two were randomized clinical trials to assess the efficacy of routine prenatal ultrasound examination. Together, these 16 projects, all of which entailed analysis of data, accounted for \$5.4 million of the \$8.3 million total allocated by the NICHD for fetal research. The remaining projects involved data collection, evaluation activities or such noninvasive procedures as maternal blood monitoring.⁴³

Private Funding

In FY 1989, more than \$20 billion was spent on health-related research and development. Almost half that amount, some \$9.2 billion, came from the federal government; state and local governments contributed just over \$1.3 billion. The rest came from private sources, including pharmaceutical companies, research and development

companies and nonprofit organizations.⁴⁴ Despite the roughly even split between public and private support, most basic research is funded by the federal government. "Biomedical research in this country depends on Public Health Service funding, especially at the clinical level," observes Hoffer. "Private funds . . . are a drop in the bucket."

In a 1988 report on infertility, the Office of Technology Assessment observed that the government's *de facto* moratorium on funding of IVF research had "dramatically affected the financial ability of American researchers to pursue improvements in IVF and the development of new infertility treatments, possibly affecting, in turn, the development of new contraceptives based on improved understanding of the process of fertilization."⁴⁵ Florence Hazeltine, director of the Center for Population Research at the NICHD, estimates the NIH would receive more than 100 grant applications each year if federal funding were available for IVF research.⁴⁶

In the absence of federal support, IVF researchers rely chiefly on pharmaceutical companies, patient fees and, to a much lesser extent, university budgets to finance their efforts. A group of Illinois doctors, for example, used profits from their IVF clinic to develop a way to examine human egg cells before fertilization for certain genetic flaws—a technology that will enable doctors who perform IVF to fertilize only unaffected eggs.⁴⁷ Yet, despite fees that can run as high as \$7,000 for each attempt at pregnancy, researchers say there is little money available for investigation. "We use 99 percent of the money people pay [for IVF] to provide medical services," points out Joseph Schulman, director of the Genetics and IVF Institute in Fairfax, Virginia. Schulman contends that the 15-year moratorium on IVF "has contributed significantly to the fact that the U.S. is a follower, not a leader, in IVF research." Such funding arrangements, moreover, cannot support a large-scale IVF research program which, according to Hodgen of the Jones Institute, requires a team of geneticists, embryologists, obstetricians/gynecologists, biostatisticians and other specialists, costing several hundred thousand to several million dollars annually to employ.

Clinical trials of fetal tissue implants are also very expensive, costing as much as \$100,000 per patient,⁴⁸ because of the large number of specialists involved and the extensive testing before and after the operation. If it were simply a matter of transplanting cells into the patient and sending

him home with the hope that his condition will improve, the cost would not be so high, explains Hoffer, who was affiliated with the Swedish scientists who conducted the first clinical trials with Parkinson's patients. Rather, a scientific study involves a large group of specialists, often including a neurologist, a neurobiologist, a neurosurgeon with an expertise in neurografting, a neuropharmacologist, an embryologist, a histologist, an infectious-disease specialist, an immunologist, a radiologist and experts in comparative anatomy and behavior.⁴⁹ The patient undergoes extensive neurological examinations and other tests on a regular basis for several months before the surgery; the patient in the recent Swedish report was followed for 11 months before the implant. (In some cases, patients undergo testing only to have the doctors conclude that they are not suitable candidates for a transplant.⁵⁰) After the transplant, the patient undergoes daily, and then weekly, tests for up to two or three years. "It is expensive, but it is what you need to do to prove that the tissue is working," says Hoffer, who is currently studying human tissue transplants in animals.

The two American investigators conducting clinical trials with Parkinson's patients have found different sources of support for their work. The team at Yale headed by Redmond has raised funds from individuals and small foundations to transplant fetal tissue in 20 patients,⁵¹ while Freed, a professor of medicine and pharmacology, is supported by a local philanthropist.⁵² Freed has done transplants for two patients since 1988 and is beginning to test six additional patients for possible transplants.⁵³

Both the researchers are quick to point out, however, that support is hard to find. "There is not much money out there, I can say with great authority," reports Redmond, who believes there would be "a significant amount of direct [federal] funding of clinical and research trials based on peer review" in the absence of current government restrictions. Freed, meanwhile, is charging patients \$30,000-\$40,000 to help cover the costs of the transplant even though he has outside funding. The donor's money "is starting to run out," says an assistant, Evelyn Kriek.

One reason private funding is generally difficult to find for long-term research studies, according to Richard Kahn of the American Diabetes Association, is that private donors are more interested in paying for start-up costs, training activities or feasibility studies, rather than ongoing

clinical trials—whatever the topic. In addition, researchers say, private donors are much less inclined to support areas of research that the government has declared it will not fund. "The stamp of disapproval from the federal government is an enormous disincentive for people to give money," asserts Myron Genel, associate dean of Yale Medical School. "Private funders . . . are loathe to generate controversy. They are incredibly timid," adds Robert Cook-Deegan, formerly staff director of the Congressional Biomedical Ethics Boards.*

Oliver Lowry's efforts to get support for his IVF research from the March of Dimes is an example of this problem. The agency's initial decision to fund his research proposal was overturned by its board because, Lowry says, it feared that support for his work could jeopardize the organization's own fundraising efforts. Kevin Lafferty of the University of Colorado Health Sciences Center reports that even the Colorado Diabetes Association, a supporter of his work on fetal pancreas tissue implants in diabetics, grew nervous about continuing to fund clinical work because of the public controversy over transplants.

According to investigators who work in these areas the government's restrictions have had "chilling effects" on the researchers' working environment and have created a disincentive for young researchers to enter these fields. "The implication . . . is that there is something dirty about the work," observes Genel. "If you're gambling your career on being able to pursue scientific inquiry, you're not going to devote the time and energy in an area that is under a cloud of suspicion," he notes—or, as others point out, where the possibility of federal support is foreclosed.

The controversy over fetal tissue implants "is very distracting," says University of Wisconsin surgeon Hans Solinger, who stopped his clinical trials of fetal pancreas tissue implants in diabetes patients after the government imposed its funding moratorium. Solinger had been awarded an NIH grant to study pancreas transplants in animals and, if successful, in humans, before the moratorium was imposed. He could have continued his studies, because the ban was not retroactive, but elected not to do so.

Lafferty has also ceased clinical trials of pancreas implants, at least temporarily, in part because of the funding controversy. Instead, he is studying ways to freeze fetal pancreas tissue for future use. "There is no sense in doing more controversial things," he explains. Thomas Freeman, a Univer-

sity of South Florida neurosurgeon, who is considering clinical trials with Parkinson's patients, declined to discuss his possible funding sources because, he says, "all it would do is get me in trouble."⁵⁴

A Missed Opportunity

By restricting funding for research involving the human fetus or embryo, the government has lost valuable opportunities—some maintain it has shirked its responsibility—to provide direction for such research and to set standards to ensure high-quality studies. "When you deny NIH funding . . . you stop doing [research] in a controlled, scientific manner," asserts the University of Colorado's Hoffer. Similar concerns convinced Arlin Adams, chairman of the NIH tissue transplantation research panel and a long-time opponent of abortion, to vote in favor of federal support of research on humans. "Without government funding, there undoubtedly would be many efforts to use fetal tissue for medical research that would be completely unsupervised and not governed by any guidelines," Adams wrote in a separate opinion explaining his vote. With stringent safeguards issued by the NIH and with periodic reviews, he concluded, "there would be much greater assurance that carefully crafted guidelines will be put in place as an absolute condition to any research procedure. Such an arrangement would protect pregnant women and fetuses in a far more circumspect and intelligent manner than if the NIH did not participate in any way."⁵⁵

Research proposals seeking NIH funding go through a rigorous two-step peer review procedure, followed by an internal review by NIH staff. "When you lose the peer review system, you lose the best way to do quality research," observes Freeman, of the University of South Florida. He cites unregulated IVF clinics and the use of techniques that have not undergone adequate clinical testing as an example of what can happen when the NIH is not involved in research efforts. In its report on infertility, the Office of Technology Assessment raised the same issue, saying the NIH's failure to fund any IVF research eliminates "the most direct line of authority by which the federal government can influence the development of both embryo research and infertility treatments so as to avoid unacceptable practices or inappropriate uses."⁵⁶

Over the years, the NIH has assumed the responsibility of organizing and coordinating major research efforts in this country so that studies at different centers are conducted under identical protocols,

making the results comparable.⁵⁷ When study findings cannot be compared, they lose much of their value; for example, it is difficult to draw conclusions about the effectiveness of the several hundred fetal liver transplants that have been done, because most of the studies were not controlled and there was little standardization of patients or methods of evaluation.⁵⁸

Similarly, the poor quality of trials of fetal pancreas tissue make evaluation of clinical experience difficult.⁵⁹ "We have been extraordinarily lucky that the NIH has been very good at coordinating complicated, multi-center research projects," notes Deborah Runkel, senior program associate at the American Association for the Advancement of Science. "It is hard to think of anyone who could step in and [assume] the role and be so trusted."

Particularly in the transplant field, the government could play "a guiding . . . role," states Fred Gage, a professor of neuroscience at the University of California at San Diego School of Medicine. Without federal involvement, Gage maintains, each investigator applies his own criteria of what is safe and accurate, leaving a number of basic issues concerning fetal tissue transplants unresolved. These include the optimum age of the recipient and of the donor (both of which are likely to vary, depending on the disease being treated and the type of tissue being used), the circumstances under which antirejection drugs should be used, the method of injecting the tissue, the length of time that must elapse after the graft before a judgment on its utility can be made, and issues dealing with the battery of tests that need to be conducted to assess the outcome.

John Sladek, a neurobiologist at the University of Rochester, thinks the government should fund six to eight neuroscience centers to conduct controlled clinical trials of 200–300 Parkinson's patients. If the trials show the therapy is successful in reversing the disease or significantly ameliorating its symptoms, work could then proceed at numerous centers, he says. Sladek, who, along with Gage, Freeman, Hoffer and others, is not convinced that clinical studies are yet warranted, suggests that such an approach might help avoid the anticipated rush of Parkinson's patients clamoring for a transplant in the wake of the Swedish report. (Freed's office gets 2–3 calls a day from patients or their families requesting a transplant.⁶⁰)

*The board was established by Congress in 1985 to report on the ethical issues arising from health care and biomedical research.

Such a "bandwagon" effect occurred in 1987 after Mexican doctors announced dramatic improvements in a Parkinson's patient following transplantation of tissue from the patient's own adrenal gland (the only other tissue in the body that produces dopamine) into his brain. Doctors in the United States and elsewhere rushed to perform the operation, despite insufficient testing in animals. The result, says Sladek, was "sheer disaster." None of the patients improved to the degree that had been reported in Mexico; others suffered serious complications and some died. Observers have suggested that doctors turned to adrenal grafts chiefly to avoid the controversy over use of fetal tissue.⁶¹

Broader Implications

Beyond their direct impact on research involving human fetuses and embryos, scientists say the government's funding policies have troubling implications for scientific discourse generally, for research in other promising fields and for the ability of American scientists to lead in the international arena.

"The process of research is a slow and deliberate process that should not be constrained by peripheral, heated issues," notes University of Rochester neurology professor Ira Shoulson, who is studying new drug therapies for Parkinson's disease. Others agree that science generally proceeds a step at a time and that steps should not be skipped for political reasons. When the government makes funding decisions based on considerations other than scientific merit, asserts Hodgen of the Jones Institute, "the whole scientific process is put at risk."

The government's policies are also at odds with efforts in areas such as gene therapy, the technique of inserting DNA into cells to correct a dysfunction. "Developing alternatives to the use of fetal tissue through cellular and genetic engineering techniques very likely depends first on understanding the capacities of fetal cells," assert Yale's Genel and Sarah Carr of The Association of American Medical Colleges.⁶² In addition, maintains University of Virginia's Fletcher, federally supported efforts to "map the human genome [are] on a collision course with the lack of opportunity to conduct research with the embryo and fetus." The "genome project," as it is frequently called, is an effort to collect, map and sequence all human genes so scientists can better diagnose and treat genetic disease. But to do so, asserts Fletcher, "it will be necessary to conduct research in the embryo and fetus to learn

how genetic diseases begin and develop."⁶³

Others express concern that the inability to extend research to human subjects will discourage critical basic work with animals. "The broadest, most intimidating effect [of the fetal tissue transplant ban] is on... researchers working in basic [areas of] science," contends Redmond. "These [investigators] can work with rats, but if potential avenues for clinical... applications are cut off, why bother."

In the fields directly affected by the government's funding restrictions, researchers report that significant progress will be or already has been achieved in other countries: Swedish scientists are in the forefront of fetal tissue transplant research; British and Australian researchers lead the way in efforts to improve IVF techniques and to diagnose genetic disease in early embryos; and French investigators have begun to treat genetically defective fetuses in utero. In these countries, moreover, researchers frequently receive government support, while their American counterparts must scramble to find private funding sources. As a result, observes Baylor's Caskey, "molecular biological tools that were developed in the U.S. will be applied in other countries to prevent disease... before we use our technology to prevent disease in our population.... As an American scientist, it disappoints me that our scientists do not have the opportunity to advance human knowledge when they have the capacity to do so."

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Barriers to Prenatal Care . . .

(Continued from page 218)

status: By almost any socioeconomic indicator, Puerto Ricans are worse off than other Hispanic groups.¹²

Socioeconomic differentials alone, however, cannot explain our finding that Hispanic women had a higher risk of delayed prenatal care than black women. On most income-related measures, black women in New York and in the United States as a whole are more disadvantaged than Puerto Rican women. Furthermore, the racial and ethnic differences in timing of prenatal care in our logistic regression are independent of receipt of public assistance or of high school graduation. Nevertheless, even among those who are not high school graduates, Puerto Ricans on the mainland United States have considerably fewer years of completed schooling than do blacks.¹³ Difficulties with English and lack of familiarity with mainland health care services often exacerbate the barriers to services for Puerto Rican women.

A key contribution of the present study is the measurement of motivational impediments to care. Although only two of the 13 barriers presented to women in the closed-ended questions were in this category, women receiving late care or no care reported these two as problems more frequently than any of the 11 structural barriers. This finding should be interpreted with caution because it may be the result of retrospective justification for not obtaining care. On the other hand, given the extreme

poverty of the women who received care late or not at all, it is plausible that their lack of motivation was a result of depression and feelings of inefficacy caused by the stresses of chronic economic strain. Women in such circumstances are likely to feel overwhelmed by a variety of personal and family problems that may discourage or take priority over the initiation of preventive care.

As a whole, the findings of this study suggest the importance of recognizing and addressing motivational barriers to using health care and of improving access to care for high-risk groups such as adolescent mothers, Hispanic women, women with no health insurance and women who are substance abusers.

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Letters from Readers

Freedom of Choice

[James] Trussell and [Laurence] Grummer-Strawn, the authors of "Contraceptive Failure of the Ovulation Method of Periodic Abstinence" in the March/April issue of *Family Planning Perspectives* [22:65, 1990], deduce correctly that failure to observe the ovulation method rules for pregnancy avoidance leads to unplanned pregnancy, a probability that is high with serious infraction of the rules. However, their conclusion that natural family planning is a way of life implies that "ordinary" people either can't or won't want to use it. This perception is heightened when the authors add that couples must be counseled about the serious risk of imperfect use.

Trussell and Grummer-Strawn confined their analysis to the World Health Organization (WHO) clinical trial of the ovulation method because the training factors are well documented. However, other natural family planning acceptor studies have analyzed ordinary users from many populations. Two of our papers showed effectiveness rates competitive with those of other family planning methods.* The discontinuation rates were one-third of discontinuations for reversible contraceptive methods in the index country. Neither education nor religion was a significant predictor of acceptance, but slightly older age (29) and previous contraceptive use (oral contraceptives) militated toward more consistent use of natural family planning. Perhaps it requires a certain amount of time and (sometimes, negative) experience with other contraceptive methods to establish a solid commitment to natural family planning.

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It would be a mistake to deprive people of freedom of choice in family planning by emphasizing risk factors and thereby persuading providers not to offer natural family planning. The low number of imperfect use cycles and the high continuation rates associated with the ovulation method suggest that an emphasis on the benefits of natural family planning might be more appropriate. *Hanna Klaus, Executive Director
Natural Family Planning Center
of Washington, D.C., Inc.*

On Computing Failure Rates

The article by Trussell and Grummer-Strawn appears to support the claims of ovulation method proponents that the method does a good job of ascertaining the fertile and infertile times of the menstrual cycle. Among participants in the WHO trial, abstinence during the fertile time resulted in a very low pregnancy rate; relations during the fertile time resulted in the expected pregnancy rate for any given cycle. According to the Couple to Couple League's chief medical adviser, Ronald A. Prem, of the University of Minnesota, the probability that relations during the fertile time in any given cycle will result in pregnancy is about 30 percent; Trussell and Grummer-Strawn report a probability of 28 percent.

The authors emphasize that there is a high risk of unplanned pregnancy when couples have relations during stress cycles and hypothesize that "stress delays ovulation but not the estimated peak fecund day...." In the field of natural family planning, this is commonly known as the double-peak syndrome. After an initial "peak day," the mucus appears to dry up for several days and then reappears. However, in the charted cycles in which I have observed this phenomenon, the

second mucus patch is very short, generally lasting about three days. Thus, even if the woman detects the beginning of the second patch, sperm deposited the day before still would have a good chance of causing pregnancy. This possibility is one of the reasons why many couples prefer the cross-checking sympto-thermal method of natural family planning. In cycles in which ovulation may be delayed by stress, a couple can guard against misinterpretation of the mucus data by observing the woman's temperature pattern, which will not show a rise until after ovulation occurs.

The authors admit that their data show no relationship between coital frequency and unplanned pregnancy and yet stubbornly hold to their hypothesis that there must be such a correlation. A simpler explanation of the existing data is the very common postovulation "honeymoon" phenomenon of resuming relations after a period of abstinence.

Two things are particularly troubling about this article. First, it appears that natural methods of family planning are being singled out for a unique way of determining user-effectiveness rates, which is simply unfair. If the focus of attention is going to be on not following the rules during the fertile time, then the same standard must be applied in the same way to users of other methods. The results will be identical if users of barrier methods fail to use them during the fertile time. However, the authors' method of computing failure rates makes the pill and the IUD look better by comparison [with natural methods of family planning], and one has to wonder if that is not the overall intention.

Second, the authors, although they had access to primary data, failed to ask and to answer one of the big questions in the field of natural family planning: What is the unplanned pregnancy rate when

couples follow the rules for the period before ovulation, but push them to the limit? That is, when couples consistently have relations on the last dry day, what is the probability of conception? A second and refined question: Does the unplanned pregnancy rate among those who have mucus patches of at least five days differ from the rate among those whose mucus patches are shorter?

John F. Kippley, President
Couple to Couple League

The Authors Reply:

We agree with Klaus's conclusion that "it would be a mistake to deprive people of freedom of choice." Unlike Klaus, we believe that for freedom to be authentic, it must be well informed. Informed choice requires that family planning practitioners provide accurate information on safety and efficacy about all methods, including the fact that the ovulation method has high efficacy when used perfectly but that imperfect use incurs a high risk of becoming pregnant.

Most people choose not to rely on periodic abstinence* because—contrary to Klaus's assertion—the failure rate among typical users is high compared with failure rates for other methods† and because it requires continual monitoring of physiological symptoms and lengthy abstinence from coitus (in the WHO trial, for about half of each menstrual cycle).‡ For these reasons, we agree with Josef Roetzer that "natural contraception regulation" is a way of life. This conclusion in no way implies that "ordinary" people cannot or will not use periodic abstinence.

We used data from the WHO clinical trial not because the "training factors are well documented," but because

this trial is the only one that collected information on perfect or imperfect use during each cycle. Finally, we emphasize that a relatively small fraction of cycles of imperfect use does not indicate overall efficacy of periodic abstinence; in the WHO trial, imperfect use in only 11 percent of cycles resulted in one-fifth of all women becoming pregnant within one year of use.

In response to Kippley's letter, we maintain our hypothesis that coital frequency is a determinant of contraceptive failure. First, unless the risk per exposure of an event occurring is zero, it logically follows that the more times one is exposed, the greater is the probability that the event will occur. Kippley's honeymoon hypothesis could explain the observed lack of association between coital frequency and pregnancy if, and only if, the number of acts of intercourse that could result in pregnancy is constant across cycles, regardless of the total number of acts. While this possibility cannot be evaluated with the available data, we find it far less plausible than the hypothesis that acts of intercourse were underreported in the WHO trial. Second, the evidence for underreporting seems overwhelming. Conception rates per cycle day are much higher in the WHO trial than in other studies, and the WHO investigators themselves concluded that intercourse during the fertile phase was underreported.§

Contrary to Kippley's assertion, periodic abstinence is not being "singled out for a unique way of determining user-effectiveness rates." As we explicitly stated in our article, couples need information on efficacy during perfect and imperfect use in order to make truly informed choices about contraception. We presented the first correctly calculated probabilities of failure during perfect use (method failure) and failure during imperfect use (user failure) for any method of contraception. We chose to examine the ovulation method because the data from the WHO trial are the only available data on any method that can be used to make separate calculations of method and user failure. We would welcome analogous information for other methods.¶ Contrary to Kippley's assertion, rules for various methods do differ, and imperfect use of any given method can occur only when the specific rules governing its use are broken. For example, although the rules for the pill state that it must be taken every day, the rules for the condom state that it must be used at every act of

intercourse. Thus, it would make no sense to claim that the condom is used imperfectly if it is not used every day. Likewise, it makes no sense to apply the ovulation method rules to other methods (for instance, by defining imperfect use of the condom as such only when it occurs during the fecund period). Barrier methods such as the condom will have lower failure rates during imperfect use precisely because imperfect use can occur at times other than during the fecund period. Indeed, it is very unlikely that most users of barrier contraceptives could even identify their fecund period with any degree of precision.

Finally, Kippley's statement that we had access to primary data is misleading. Not all of the detailed information from the subjects' menstrual charts was transferred to the machine-readable analysis file constructed by WHO. The charts themselves still reside in the basement of WHO headquarters and presumably would be made available to Kippley or any other, capable analyst. However, we doubt that detailed analysis of the menstrual charts would provide a clear answer to the question he raises, given the underreporting of intercourse already mentioned.

*The 1988 round of the National Survey of Family Growth revealed that only 2.1 percent of women aged 15-44 who were at risk of an unintended pregnancy relied on periodic abstinence; of these, three-quarters used the calendar variant alone. Source: Unpublished tabulations by Barbara Vaughan from the public-use tape.

†J. Trussell et al., "Contraceptive Failure in the United States: An Update," *Studies in Family Planning*, 21:51, 1990, Table 1.

‡C. Djerassi, "Fertility Awareness: Jet-Age Rhythm Method?" *Science*, 248:1061, 1990; and World Health Organization (WHO), "A Prospective Multicentre Trial of Natural Family Planning. III. Characteristics of the Menstrual Cycle and of the Fertile Phase," *Fertility and Sterility*, 40:773, 1983.

§WHO, "A Prospective Multicentre Trial of Natural Family Planning. III. Characteristics of the Menstrual Cycle and of the Fertile Phase," *Fertility and Sterility*, 40:773, 1983.

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Hormonal Implants Prove to Be Highly Acceptable, Although Nearly All Users Experience Side Effects

Women at an urban family planning clinic found NORPLANT® contraceptive implants to be highly acceptable, although nearly all users reported at least one side effect and four out of five reported menstrual changes.¹ More than half of the women interviewed were trying the implant because they were dissatisfied with other contraceptives; 42 percent because they thought it would be easy to use. Seventy-four percent of current users said they would use the implant again, as did more than half of those who had discontinued use. However, women who had discontinued implant use because of side effects were far less likely to say they would use the implant again than women who stopped using the method for other reasons.

From March 1986 through July 1989, women participating in a five-year clinical trial of the hormonal implant system NORPLANT at the University of California Family Planning Clinic at San Francisco General Hospital were asked, either in person or over the phone, a number of questions about their experience with the implant. When interviewing began, 23 percent of the 250 original study participants had discontinued use; these women had used the method for an average of 10 months. However, the investigators were able to complete interviews with 90 percent of all women who discontinued, and with 82 percent of active users. In all, 205 women were interviewed.

Forty-four percent of the women surveyed were Hispanic, 37 percent were Caucasian, 13 percent were black and six percent were Asian or Native American. The average age of those interviewed was 28. All study participants were required to have had at least one pregnancy and one live birth; the average number of pregnancies among those surveyed was 3.2, and the average number of live births was 1.8.

Ninety-seven percent had used other contraceptives before using hormonal implants; nearly half had most recently used oral contraceptives, one-quarter had used barrier methods immediately before starting implant use and more than one in 10 had used no birth control.

Most of the women interviewed had heard about the implants through the study clinic itself (36 percent) or the media (34 percent); some found out about them from friends, relatives or other sources. Prior to the study, nearly all those interviewed had had questions about hormonal implants; side effects were the most common concern (58 percent), followed by effectiveness (45 percent) and safety (42 percent). Over half of the women (54 percent) said they were trying the implants because of dissatisfaction with other contraceptive methods; other reasons were the method's ease of use (42 percent), effectiveness (26 percent), long-term protection (19 percent) and advantages over sterilization (12 percent).

Although 59 percent of the women recalled having had no anxiety about the implant prior to use, 33 percent reported having felt some anxiety and eight percent reported having had a great deal of anxiety. The most common fear had been pain during insertion of the implant (21 percent of all women), but 87 percent reported that they had felt little or no pain. Sixty-two percent of the study participants said they had not been afraid of the removal procedure; 74 percent of those who discontinued use experienced little or no pain at removal. Two-thirds said they had not been worried about possible side effects; those who had were mostly worried about long-term effects such as cancer (30 percent) and effects on future fertility, including the risk of abnormal births (27 percent).

Convenience was the implant's best fea-

ture, according to three-quarters of the women interviewed, followed by effectiveness (29 percent) and long duration of protection (16 percent). Thirty percent of the women found no feature they disliked, but 32 percent disliked the menstrual changes they experienced. Others complained about weight change (nine percent), headaches (six percent) and acne (five percent). Five percent or less mentioned mood changes, the implant's appearance or the implant's insertion process as bothersome features. The majority of women (61 percent) said their partner approved of the implant, mostly because of its ease of use (34 percent), because "the implant works" (29 percent) and because of the lack of obligation for the partner (nine percent). In contrast, 12 percent of the women reported that their partners did not like the implant, mostly because of concern about side effects (96 percent) and menstrual changes (50 percent).

Ninety-five percent of the women surveyed said they experienced at least one side effect while using the implant, while 61 percent had experienced two or more. Eighty-two percent of those interviewed had had menstrual changes, including irregular bleeding (40 percent), intermenstrual spotting or bleeding (32 percent) and more frequent bleeding (25 percent); lesser proportions reported heavier bleeding (16 percent), amenorrhea (12 percent) and lighter bleeding (10 percent). However, 84 percent of the women with menstrual changes said they had expected them, and 69 percent reported that they were not (or only slightly) bothered by them.

In addition, 32 percent of the women had experienced changes in weight, 24 percent had had headaches, 16 percent had experienced mood changes and 15 percent had developed acne. One-quarter of those interviewed experienced other side effects, including decreased libido, chest pains,

numbness in the arm, increased hair growth, uterine cramping, premenstrual syndrome and higher blood pressure, but no more than four percent had experienced any one of these side effects. Forty-four percent of the women who had experienced any side effects said they had considered having the implant removed because of them, and those who chose to discontinue use were more likely than other women to have experienced multiple side effects (40 percent vs. 27 percent). Twenty-seven percent of the women said that they had not been bothered by any side effects they had experienced, but those who discontinued implant use were less likely than other women to have said so (14 percent vs. 34 percent).

Forty-four percent of women said their sex life had changed as a result of implant use, and almost two-thirds of those said it was better; however, about one-quarter said it was worse. Many of those who experienced a positive change said it was because they were less concerned about pregnancy (51 percent) and because sex could be more spontaneous (26 percent). Among the women whose sex life had declined, 26 percent attributed this to less frequent intercourse because of menstrual changes, while eight percent reported decreased libido.

Among the 110 women who had had their implant removed, 46 percent gave side effects as the reason, while 14 percent said they had had the implant removed because they feared it would lose effectiveness over time, seven percent because they were moving from the area, six percent because they wanted to become pregnant and five percent because they believed they no longer needed birth control. One-fifth of the women who discontinued implant use went on to have sterilization operations, or their partners did.

Ninety-four percent of the 140 women who were current users at the start of the interview period said they were satisfied with the implants and would therefore continue to use them. More than half (59 percent) of these women planned to use the implants for five years; an additional 24 percent said they wanted to use them for more than five years. Seventy-four percent of current users said they would want to use contraceptive implants again in the future; another 21 percent said they might use them again, and five percent said they would not. Sixty-one percent of the women who discontinued said they would use the implants again; nearly 23 percent said they would not. Only 16 percent of women who had discontinued because of side effects

said they would use the implants again, compared with 75 percent among those who discontinued for other reasons.

The investigators suggest that those dispensing contraceptive implants should provide a frank description of possible side effects. Such information will probably not discourage most women from using the implants: The majority of women in this study were willing to accept some side effects—most notably menstrual changes, which were consistently tolerated—to use a safe, reliable method of contraception. The researchers conclude that, despite possible side effects, "NORPLANT can be highly acceptable to most women who seek a convenient, effective, temporary method of contraception."—R. Turner

Reference

1. P. D. Darney et al., "Acceptance and Perceptions of NORPLANT Among Users in San Francisco, USA," *Studies in Family Planning*, 21:152, 1990.

Advanced Maternal Age Poses No Major Health Risk for First-Born Infants

Infants born to women who are 30 or older appear to be just as healthy at birth as those born to younger women, although older first-time mothers may be more likely than mothers in their 20s to experience complications during pregnancy and delivery.¹ In a recent study of nearly 4,000 first births to women aged 20 and older, researchers found that infants born to women 35 or older were not at significantly increased risk of low birth weight, preterm birth, small size for gestational age, low Apgar scores or perinatal death, compared with those born to younger mothers. (Even so, infants born to older mothers were more likely to show fetal distress, to be delivered by cesarean section and to receive intensive care than were other infants.) In contrast, older mothers, particularly those over 35, were more likely than women in their 20s to have gestational diabetes, pregnancy-induced hypertension, gestational bleeding, premature detachment of the placenta (abruptio placentae) or formation of the placenta in the lower part of the uterus (placenta previa); and, at delivery, they were more likely to have hypertension, uterine bleeding and a prolonged second stage of labor.

The study was based on the pregnancy outcomes of 3,917 women delivering singleton first-born infants at a New York City hospital between 1985 and 1987. All of the women were private patients at the

hospital, and all were at least 20 years of age; 58 percent were 30 or older at the time of their first delivery. Rates for fetal and maternal complications during pregnancy and the perinatal period were compared among women aged 20–29, 30–34, 35–39 and 40 or older. The researchers used multiple logistic-regression analysis to measure the association between maternal age and various outcomes, while controlling for various confounding variables.

Women aged 35 or older were 40 percent more likely than younger women to have a low-birth-weight infant, but this increased risk did not reach statistical significance. (After adjustment for race, chronic medical conditions, cigarette smoking, and sex of the infant, the risk was only 30 percent higher.) The rate of preterm delivery (defined as births occurring at less than 37 weeks' gestation) showed little difference by age-group, and was slightly lower among women aged 40 or older compared with those in their 20s. Similarly, the rate of delivery of small-for-gestational-age infants was slightly lower among women aged 30–34 and those aged 40 and older than among those aged 20–29. When age was used as a continuous variable, a potential trend between increasing maternal age and the risk of low birth weight could be detected ($p=.09$), but no such trend was found for preterm delivery or delivery of small-for-gestational-age infants.

Although infants of older mothers seemed to suffer no ill effects, the mothers themselves were more likely to experience complications during pregnancy and childbirth. During pregnancy, older women had higher rates of gestational diabetes, pregnancy-induced hypertension, gestational bleeding, abruptio placentae and placenta previa than did their younger counterparts. When the researchers combined all of these complications into a single variable and adjusted for race and underlying medical conditions, they found that women aged 35 or older were at 2.0 times the risk of those aged 20–29. Women in the older age-group were also 40 percent more likely to experience intrapartum complications such as hypertension, uterine bleeding and fetal distress. There were no significantly elevated risks for any of these complications among 30–34-year-olds.

The risk of a prolonged second stage of labor (lasting more than two hours) was 50 percent higher among women aged 30–34 and 60 percent higher among those aged 35 or older; among women in these two age-groups, the risk of having a cesarean

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section was 30 percent and 80 percent higher, respectively. The investigators observe that no specific indications account for this increased number of cesareans, excluding those that were elective and those performed because of placenta previa or abruptio placentae.

Although low Apgar scores were slightly more common among infants born to women aged 30–34 than among offspring of women in their 20s, they were less likely among infants of mothers aged 35 or older. However, infants born to women aged 30–34 and those born to women aged 35 and older were 30 percent and 40 percent more likely, respectively, to be admitted to the newborn intensive care unit

than were babies born to 20–29-year-olds.

The investigators conclude that aside from a slightly increased risk of delivering low-birth-weight infants among women aged 35 or older, advanced maternal age has little effect on the neonatal outcome of singleton pregnancies. On the other hand, women aged 30 and older are at somewhat higher risk for certain antepartum and intrapartum complications. The investigators caution that since their study group primarily consisted of white, married, college-educated and nonsmoking women, the results of the study may not be applicable to the general population. They also point out that the number of women aged 40 or older (117) was too small for extensive analysis, and that the study did not evaluate outcomes such as spontaneous abortions, chromosomal abnormalities and multiple gestations, all of which are known to be associated with maternal age.

An accompanying editorial concludes that although fecundity decreases with advancing age, this study offers reassurance to the growing number of women in their 30s who have delayed their first pregnancy.² The author notes that chorionic villus sampling and amniocentesis permit early detection of many chromosomal defects, and that "the few pregnancy-related problems in nulliparous women who are 35 or older are readily manageable in 1990." He adds that the lack of a clear rationale for the high rate of cesarean deliveries among older first-time mothers in this study "would seem to be an issue worthy of attention and study [by] individual obstetrical services."—M. Witwer

References

1. G. S. Berkowitz et al., "Delayed Childbearing and the Outcome of Pregnancy," *New England Journal of Medicine*, 322:659, 1990.
2. R. Resnick, "The 'Elderly Primigravida' in 1990," *New England Journal of Medicine*, 322:693, 1990.

Vaginal Ring Is Comparable in Safety and Efficacy To Other Low-Dose, Progestogen-Only Methods

Clinical trials of the Silastic 382 vaginal ring indicate that it is an effective contraceptive method for at least one year of use.¹ The ring, which releases 20 mcg of levonorgestrel every 24 hours, was tested in 19 centers in 13 countries; 1,005 women participated in the tests. The pregnancy rate with the device in place was 3.7 per 100 women at the end of one year. The one-year discontinuation rate, including loss to follow-up, was 50 percent.

The vaginal ring used in the clinical trials was developed by the World Health Organization as a low-dose progestogen-only device. The ring, which contains a core of 5 mg of levonorgestrel, must be replaced every 90 days. In these trials, conducted from 1980–1986, the ring was tested in centers in Africa, Asia, Europe and Latin America.* Women selected for the study were aged 19–34, were menstruating and having intercourse regularly, had proven fertility (either a child or an abortion during their current marriage), had not used injectable or implant contraceptives in the previous three months or oral contraceptives in the previous month, and were able to fill out a menstrual diary card. The women were instructed not to have inter-

course without the ring in place and not to remove the ring unless it was likely to be expelled during defecation, in which case it could be removed beforehand and reinserted immediately afterwards. Any expulsion or removal, as well as incidents of bleeding or spotting, were to be recorded in the diary.

A total of 26 pregnancies occurred with the ring in place, for a one-year cumulative pregnancy rate of 3.7 per 100 women. (One pregnancy, after 249 days of ring use, was ectopic; this rate is within the range of copper IUDs and progestogen-only contraceptives.) Pregnancy rates were consistent across regions, except for Africa, where life-table pregnancy rates were twice as high as in other regions (8.2 per 100 women, compared with a range of 2.9–3.8 in Asia, Europe and Latin America). A higher body weight added to the risk of pregnancy; those who weighed 40 kg, for example, had a rate of 1.7 compared with 9.8 among those weighing 80 kg.

Six additional pregnancies were attributed to intercourse without the ring in place; in five instances, the ring was removed by the subject, and in one, intercourse took place when the ring had been expelled without the subject's knowledge. Most of the 32 pregnancies ended in induced abortion, but four resulted in live births of normal babies; at the time these infants were conceived, the rings had been in place 5–8 weeks.

At the end of one year, 50 percent of the women originally enrolled in the study were no longer participants. Of these, 19 percent were lost to follow up, and six percent had become pregnant. The remaining women discontinued use because of menstrual problems (27 percent), other medical reasons, such as vaginal irritation (21 percent), nonmedical reasons, such as desire to become pregnant (15 percent) and expulsion of the ring (11 percent). Discontinuation rates varied widely across regions; China had the lowest rate (32 percent) and Africa the highest (69 percent).

Although 57 women discontinued use because the ring was expelled, expulsion did not necessarily lead to discontinuation, since 243 women experienced a total of 504 expulsions. The majority of expulsions occurred during defecation (57 percent), with others attributed to menstruation (17 percent), urination (12 percent), strenuous activity (five percent) and intercourse (two percent). The odds of expulsion rose with age and parity, so that women who had had three children were almost twice as likely as those who had had only one to expel the device. Most women who expelled the device did so in the first six months: Twenty-three percent of women had done so within that time, compared with 29 percent at one year. The rate of second expulsions was 45 percent within six months of the first expulsion. Women in Asia had almost twice the first expul-

*Women were enrolled in the study from one center each in Brazil, Colombia, Cuba, Pakistan, the Soviet Union, Sweden, Switzerland, Thailand, Tunisia and Zambia; two centers in England; three in India, and four in China.

sion rate of women in the other regions.

A total of 121 women said they removed the ring on at least one occasion, most often because of pain or bleeding (26 subjects) and vaginal irritation or discharge (26 subjects). Other reasons given for removal included wanting to clean the ring, wanting to prevent expulsion during defecation, or simply being curious; less than one percent removed the ring because of discomfort during intercourse. There were low rates of removal in Asia and Africa and high rates in Europe. Removal rates in Latin America varied from center to center.

Menstrual disturbances such as prolonged, heavy or intermenstrual bleeding were the primary reason women discontinued use. From menstrual diaries provided by 702 participants, the investigators determined that around half of the women in the study experienced changes in their bleeding patterns in each 90-day reference period. Irregular bleeding, experienced by approximately 25 percent of the ring users, was the most common complaint. Another 10 percent had prolonged menstrual cycles and 10 percent had shortened cycles.

The investigators speculate that some of the 72 women who said they were discontinuing ring use to become pregnant might actually have been dissatisfied users; the menstrual diaries of all but four indicated menstrual disturbances such as prolonged bleeding or spotting episodes. In general, there was no strong correlation between reasons given for discontinuation and what was recorded in the menstrual diaries for the 90-day period prior to discontinuation. However, a trend analysis revealed that women with bleeding patterns differing most from the norm tend to discontinue method use first, and that the most recent bleeding pattern a woman experiences will be the strongest factor in her decision whether or not to continue ring use.

The women who discontinued use of the ring because of other medical problems had experienced vaginal irritation, discharge or infection. Two women had what the investigators considered to be adverse reactions that could be related to the progestogen in the ring: One woman became hypertensive after six months of ring use, but her blood pressure returned to normal after discontinuation, and another discontinued after 56 days because of general itching and breast tenderness.

There were 77 discontinuations for non-medical reasons, with desire to become pregnant the most common, followed by

removal of the ring at the partner's request. Other reasons included a wish to change methods, adverse publicity, dissatisfaction and unspecified personal reasons.

The investigators conclude that the contraceptive efficacy and medical safety of the WHO vaginal ring are comparable to other low-dose, progestogen-only contraceptives for at least one year of use.

—R. Turner

Reference

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Half of All Women Who Remarry Bear a Child With Their New Spouse

Approximately half of all women who marry for a second time have a child during that marriage; half of those who do so give birth within 18 months after remarrying. The likelihood of childbearing after remarriage varies more according to social and demographic variables for white women than it does for blacks. These findings come from a recent study examining childbirth trends among the growing number of women remarrying during their reproductive years.¹

Using data from the 1985 Current Population Survey, the study examined childbearing patterns among 3,603 white and 255 black women who married for the second time between 1960 and 1984, before age 36, and had fewer than five children at the time of remarriage. By the time of the survey, 48 percent of the women had had a birth after their second marriage. No differences were found by race in the proportion who had already had a birth, but an additional seven percent of white women said they expected to have a child, compared with three percent of black women.

Thirty-five percent of the total births the women had had by the time of the survey occurred after remarrying; combining current with expected fertility shows that around 39 percent of the total births to survey participants have occurred or will

have occurred after the second marriage. Whites had fewer children at remarriage and higher fertility thereafter; hence, a greater percentage of all births among whites than among blacks occur in second marriages (35 percent compared with 28 percent). At the time of the survey, participants had had an average of 0.72 births after remarriage and expected to have an additional 0.15 births. White women had had 0.72 births after remarriage and expected 0.16 more; for black women, the numbers of actual and expected births were 0.67 and 0.07, respectively.

Life-table estimates, based on only the first birth occurring in the second marriage, showed that 51 percent of whites and 45 percent of blacks will give birth within 60 months of remarriage. Fifty percent of the white women and 54 percent of the black women who gave birth during their second marriage did so within 18 months of remarrying. The median time period from remarriage to first birth was 17 months.

Whites who married for the second time before 1969 were more likely than those remarrying later to have children after remarriage; baby-boom attitudes toward childbearing might still have been present. Little difference was found in the probability of having children during a second marriage among whites who remarried in 1969–1976 or 1977–1984. The probability of a black woman having a child during a second marriage was not related to the year in which she married and did not differ significantly from that of white women remarrying after 1968.

Proportional-hazards models (also examining only first births in second marriages) showed that for whites, the probability of giving birth after the second marriage usually varied significantly by social and demographic characteristics. Whites younger than 22 at remarriage were 36 percent more likely to give birth during that marriage than those remarrying at ages 22–26 (the reference group). White women remarrying at ages 27–30 and at ages 31 and older were 37 percent and 58 percent less likely to give birth in the new marriage. Surprisingly, however, women who were younger than 21 at the dissolution of their first marriage were significantly less likely than those who were 21–23 at dissolution to have children in a second marriage. Those who were older than 24 at dissolution did not differ significantly from the reference group.

Whites with two or more children at remarriage were significantly less likely to have children in their new marriage, com-

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pared with those who had no children at remarriage. Widows were 44 percent more likely to have a child in their second marriage than were divorcees. Women who did not complete high school were 21 percent more likely to give birth in the second marriage than those who had finished high school, and those whose first marriage lasted less than four years had a 28 percent greater chance of giving birth in their second marriage than those whose first marriage lasted longer.

For black women, the proportional-hazards model revealed only two statistically significant differences. Black women who were younger than 21 when their first marriage ended were, like their white counterparts, significantly less likely than those 21-23 to have children after remarriage (44 percent). Contrary to the findings for white women, black women with a college education had a 166 percent greater chance of giving birth during the second marriage than those with a high school diploma.

The researchers note that as the age at first birth rises and as durations of first marriages become shorter, more women are remarrying just before or just after beginning childbearing. As a result, fertility following a second marriage plays an increasingly important role in the overall fertility of U.S. women.—R. Turner

Reference

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Marital Dissolution Risk Affected by Number and Age of Couple's Children

Couples who have 3-4 children appear to be less likely to separate than those who have no children. With five or more children, the risk of marital dissolution rises, although the likelihood that a couple will separate is still highest among childless couples. According to a study of children's influence on marital stability,¹ dissolution rates fluctuate with the arrival and aging of children. Rates are relatively low when the youngest child is under age three; they rise sharply when that child reaches the mid-teens and decline substantially once the youngest child reaches adulthood.

Data from the marital and fertility histo-

ries recorded in the June 1985 Current Population Survey (CPS) were used to sort out the effects of the arrival and aging of children on marital stability. The researcher constructed three continuous-time regression models that designated the age and number of children as covariates changing over time. Model 1 included the total number of children, Model 2 included the age of the youngest child and the total number of older children and Model 3 included the age of the oldest child and the total number of younger children. Control variables in all three models included the woman's age at marriage, duration of marriage, marriage cohort and years of education. Only data on women who had had at least one child were entered into the second and third models.

To avoid potential bias caused by remarriage, premarital fertility or race, the analysis was restricted to first marriages among non-Hispanic white women. Marital dissolution was dated from the couple's separation rather than from the date of divorce. Children who had died or who were not living with their mother were not recorded in the CPS data, but this omission probably affected only a small proportion of cases.

According to the CPS data, separation rates are highest among the more recent marriage cohorts and in the third through seventh year of marriage. The woman's education does not influence dissolution rates substantially, although less-educated women have slightly higher rates of separation. Although the arrival of a child seems to deter marital dissolution, especially in the first year after the birth, this effect is not as strong among couples with a large number of children as it is among those with only a few.

According to the results of Model 1, marital dissolution rates among couples with one, two and three children are roughly 26 percent, 37 percent and 44 percent lower, respectively, than those among childless couples. The effect of having a fourth child, however, is similar to that associated with having a third. Once a fifth child is born, the risk of dissolution rises again, although it is still not as high as the rate among childless couples. There is a statistically significant difference ($p < .05$) between the effects on marital dissolution of having three children and that associated with having five or more. The author of the study notes that his findings "suggest that any number beyond three children would not enhance marital stability."

The results of Model 2 indicate that the

aging of the youngest child influences marital stability substantially: The risk of separation is relatively low when the youngest child is less than three years old, and reaches a plateau as the youngest child passes through ages 7-12; it peaks at the mid-teens and drops sharply after age 17. By the time the youngest child is an adult, the parents' risk of marital separation is even lower than that associated with having very young children in the household.

Model 3 implies that the risk of separation increases systematically with the age of the oldest child. After reaching a plateau when the oldest child turns nine, the risk of marital dissolution begins to rise again at age 15. Furthermore, there is no sign of a decline in the risk of marital separation after the oldest child reaches adulthood; instead, the downturn occurs only when the youngest child has passed through adolescence, a finding consistent with research showing that marital satisfaction is lowest among couples raising teenagers. The analysis only partially confirms the hypothesis that the dependency of young children prompts a low risk of separation: Rates of marital dissolution are low when dependency is very strong (with very young children) as well as when it should be minimal (with adult children).

Children's stabilizing effect on a marriage is thus strongest when they are very young or have all reached adulthood, and when family size is moderate (no more than four children). "The increased stability following the arrival of children is evidence [either] that children do add something positive to the marriage or that children increase the cost of dissolution," claims the researcher, who also observes that parents who have weathered the child-rearing years together have necessarily formed solid and strong unions. He suggests that part of the current rise in marital dissolution rates may stem from the increase in rates of childlessness and the growing tendency toward having families of 1-2 children.

The investigator also notes, however, that the mechanism explaining the association between children and marital stability could not be identified in his analysis. He recommends further investigation on the rewards and costs of childrearing, and that the research include more precise data on the living situations and the timing and spacing of children.—L. Remez

Reference

1. T. B. Heaton, "Marital Stability Throughout the Child-Rearing Years," *Demography*, 27: 55, 1990.

Two-Thirds of Danish Teenage Abortion Patients Used No Contraceptive

Although about 90 percent of a sample of Danish 16–19-year-olds seeking abortion had ever practiced contraception, only about one-third were using a method at the time they became pregnant. According to a study comparing adolescents who were about to undergo an abortion with similar nonpregnant adolescents,¹ the pill was the last method used by 44 percent of the pregnant adolescents and 62 percent of the nonpregnant young women. Several factors may have contributed to the unintended pregnancies among the teenage abortion patients, including a pause in the use of an effective method such as the pill, inefficient use of condoms, a relatively higher proportion of steady partners and greater fecundity.

Researchers from the University of Odense, Denmark, examined the factors behind unsuccessful contraceptive use by comparing the sexual and contraceptive experiences of a group of pregnant teenagers seeking abortion with those of a group of nonpregnant, sexually active teenagers. Both samples included only women aged 16–20 who were sexually active and who did not want to have a child before age 20. The study sample consisted of 140 women who were admitted to seven hospitals on Funen, Denmark, for legal induced abortions from January 1985 through May 1986. The respondents to a survey conducted by the Danish Institute of Social Research in 1984–1985, which asked questions on contraceptive use and sexual behavior, made up the reference sample of 201 nonpregnant women.

Although the average age of the women in both samples was roughly 18 years, the age distribution varied significantly, with the sample of pregnant adolescents containing proportionally more 16-year-olds. Adolescents in the abortion sample had a slightly lower age at first intercourse (15.7 vs. 16.2) and were more likely to have a steady partner (85 percent vs. 70 percent), to be living with or married to their partner (19 percent vs. 14 percent) and to have had a previous pregnancy (16 percent vs. seven percent). The young women in both samples reported roughly the same number of lifetime sexual partners, although a slightly higher proportion of the pregnant women either could not recall the exact number or had had over six (34 percent vs. 24 percent). Overall, women in the abortion sample who had been sexually active longer reported having had more sexual

partners. However, the data do not give an accurate picture of coital frequency, since the most common response among all women to a question on the total number of acts of intercourse was "cannot remember." The researchers speculate that the higher proportions of steady, cohabitating and married partners among the abortion sample imply a higher frequency of sexual intercourse among these women.

There were clear differences between the two groups regarding contraceptive use at first intercourse. Although roughly two-fifths of women in both groups used a condom at first intercourse, the pregnant adolescents were significantly less likely to have been using the pill at first intercourse (25 percent vs. 38 percent) and much more likely to have been using no method at all (27 percent vs. 18 percent).

Eighty-four percent of the nonpregnant women reported that they were currently using a method—63 percent the pill, 11 percent the condom and 11 percent other methods (the IUD, diaphragm and foam). For the women who became pregnant unintentionally, the majority—64 percent—said they were using no method at the time conception probably occurred. A further 17 percent were using condoms, 11 percent were using other methods and six percent were taking the pill. Withdrawal, rhythm or douche were never mentioned. When asked about the method they had last been using regularly, 44 percent said they had been taking the pill, 30 percent had been using the condom and 13 percent reported using other methods.

The investigators surmise that a probable higher coital frequency contributed to the unintended conceptions. Clearly, a more direct cause of unintended pregnancy was nonuse of a contraceptive method. Nonetheless, the investigators comment that a "remarkable" one-third of the pregnant women had been using a method at the probable time of conception. "Thus," they conclude, "Danish teenagers do try to prevent pregnancies and [their] lack of knowledge about contraception is not the major factor behind the numerous induced abortions in Denmark." They suggest that other behavioral and biological factors may play a role, such as failure to use the pill correctly and consistently, very high fecundity among some young women and initiation of sexual activity soon after menarche. To address the problem of intermittent pill use, the researchers recommend that teenagers for whom oral contraceptives are prescribed be followed up repeatedly. Moreover, one in six of the pregnant adolescents con-

ceived despite condom use, which indicates that condoms are often used ineffectively by members of this age-group. The researchers hypothesize that current campaigns to increase awareness of the condom's efficacy in preventing STDs in general (and AIDS in particular) might also increase its effectiveness in preventing unintended pregnancy among these young women.—L. Remez

Reference

1. H. Wielandt and U. M. Hansen, "Sexual Behavior, Contraception and Unintended Pregnancy Among Young Females," *Acta Obstetrica et Gynecologica Scandinavica*, 68:255, 1989.

Oral Contraceptive Use May Protect Against PID Caused by Chlamydia

Use of oral contraceptives may reduce the risk of symptomatic pelvic inflammatory disease (PID) caused by chlamydia, according to a study of 880 women who visited a Seattle medical center between 1982 and 1988.¹ The study compared contraceptive use among women who did and did not have PID; about 90 percent of the cases and about 30 percent of controls were infected with either chlamydia or gonorrhea. Among women with chlamydial infections only, those who had PID were significantly less likely than those without PID to use oral contraceptives. No such relationship was found, however, between the use of oral contraceptives and the incidence of PID among women with gonococcal infections. The researchers caution that although the pill may provide some protection against PID, it does not prevent cervical infection caused by chlamydia, gonorrhea or other organisms. In fact, oral contraceptive users more often have cervical infections from chlamydia than do nonusers or users of other methods.

Only women older than 16 who had been sexually active during the past six months were included in the study. Potential cases (all of whom reported lower abdominal pain of less than three weeks' duration) were excluded if they had recently undergone pelvic or abdominal surgery or abortion, or if they had been taking antibiotics or were allergic to those provided during the treatment phase of the study. Potential controls (women visiting a sexually transmitted disease clinic at the same medical center) were excluded if they had recently taken antibiotics or used vaginal medication or if they had had a hysterectomy, were pregnant or had clinical evidence of PID.

DIGEST

Potential cases as well as controls were examined for clinical symptoms of the disease. Of the 282 suspected cases, acute salpingitis, endometritis or both were confirmed in 141 women either by laparoscopy (17), endometrial biopsy (65) or both (59). The study included these 141 women with confirmed PID and 739 randomly selected, sexually active women with no clinical evidence of the disease. Among the 141 women with PID, 55 were infected with chlamydia and 69 with gonorrhea; among controls, there were 111 and 102 women with chlamydia or gonorrhea, respectively.

The researchers found that cases were significantly less likely than controls to be using oral contraceptives or any birth control method: Twenty percent of cases were using the pill, as were 33 percent of controls; 43 percent of cases were using some method of birth control, compared with 67 percent of controls. Women who were using oral contraceptives were 40 percent less likely than nonusers to have PID (adjusted odds ratio, 0.6) and 50 percent less likely to have PID than those who used no birth control method (adjusted odds ratio, 0.5).

The researchers found no significant associations between pill use and PID when they compared the 141 confirmed cases with the 141 women whose symptoms were merely suggestive of PID.

The study also stratified cases and controls into various subgroups according to whether they were infected with chlamydia only (26 and 79 women, respectively), gonorrhea only (40 and 70, respectively), both (29 and 32, respectively) or neither (41 and 558, respectively). Among the subgroup of patients infected with chlamydia only, there was a significant negative association between oral contraceptive use and PID: Women using the pill were 80 percent less likely to have PID than those who did not use the pill and those who used no birth control method (the adjusted odds ratio in both cases was 0.2). However, no significant associations were found among patients infected with gonorrhea only.

Cases differed from controls in a number of characteristics: They were generally younger and more likely to be nonwhite, parous and less educated. They were also more likely to smoke and to douche. Cases had started having intercourse at a younger age than did controls, and had a larger number of lifetime sexual partners and more frequent sexual intercourse; they more often reported a history of chlamydial and gonococcal infections as well

as PID. However, oral contraceptive use remained negatively associated with PID compared with nonuse of the pill and with use of no method, even after the investigators adjusted for the effect of these variables.

The relationship between oral contraceptive use and PID is complicated and not completely understood. For example, the researchers point out that other reports have shown that oral contraceptive users may be at *increased* risk of PID, since they are more often infected with chlamydia than either nonusers or users of other methods. On the other hand, among women with clinical symptoms of PID, those who use the pill tend to have less severe forms of the disease. (In this study, however, there was no difference in the degree of tubal damage between the oral contraceptive users and nonusers.) Although the link between oral contraceptive use and a reduced risk of chlamydial PID has not been proved, the researchers suggest that hormones in the pill may change the susceptibility of mucosal cells to *Chlamydia trachomatis* or may modify immune responses to chlamydial infections.—M. Witwer

Reference

1. P. Wølner-Hanssen et al., "Decreased Risk of Symptomatic Chlamydial Pelvic Inflammatory Disease Associated with Oral Contraceptive Use," *Journal of the American Medical Association*, 263:54, 1990.

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REFERENCES: 1. McClure DA, Edelman DA. Worldwide method effectiveness of the Today® vaginal contraceptive sponge. *Adv Contracept* 1:505-511, 1985.
2. North BB, Vorhauer BW. Use of the Today® contraceptive sponge in the United States. *Int J Fertil* 30:81-84, 1985.

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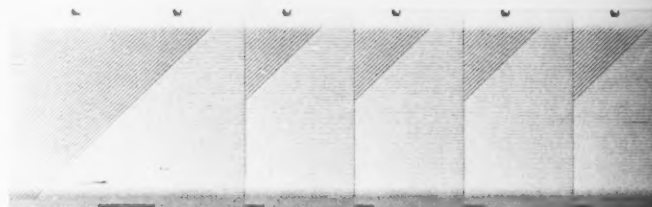
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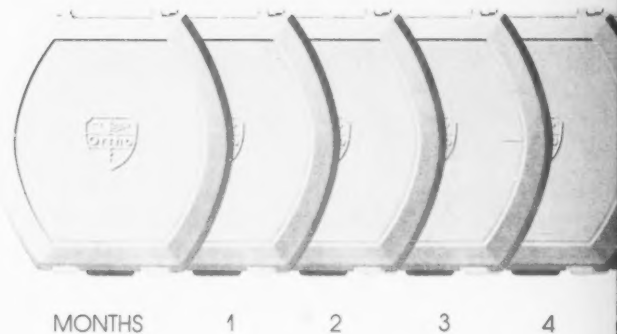
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Reference 1. Data on file. Medical Affairs Dept, Parke-Davis.

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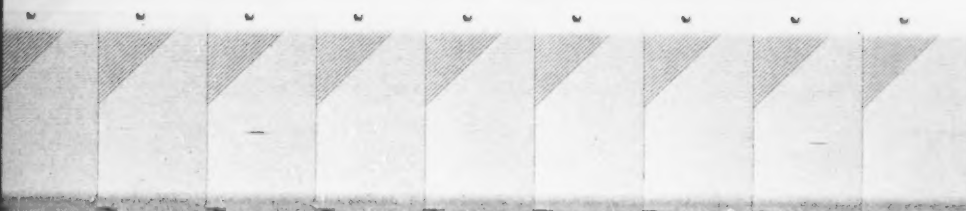
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Before prescribing, please see full prescribing information. A Brief Summary follows:

INDICATIONS AND USAGE: Loestrin 21 and Loestrin Fe are indicated for the prevention of pregnancy in women who elect to use oral contraceptives (OCs) as a method of contraception. **CONTRAINDICATIONS:** OCs should not be used in women who currently have the following conditions: 1. Thromboembolic or thrombotic disorders. 2. A past history of deep vein thromboses or thromboembolism. 3. Cerebral vascular or coronary artery disease. 4. Known or suspected carcinoma of the breast. 5. Carcinoma of the endometrium or other known or suspected estrogen-dependent neoplasia. 6. Undiagnosed abnormal genital bleeding. 7. Cholestatic jaundice of pregnancy or jaundice with prior pill use. 8. Hepatic adenomas or carcinomas. 9. Known or suspected pregnancy.

WARNINGS

Cigarette smoking increases the risk of serious cardiovascular side effects from oral contraceptive use. This risk increases with age and with heavy smoking (15 or more cigarettes per day) and is quite marked in women over 35 years of age. Women who use oral contraceptives should be strongly advised not to smoke.

The use of OCs is associated with increased risks of several serious conditions including myocardial infarction, thromboembolism, stroke, hepatic neoplasia, and gallbladder disease, although the risk of serious morbidity or mortality is very small in healthy women without underlying risk factors. The risk of morbidity and mortality increases significantly in the presence of other underlying risk factors such as hypertension, hyperlipidemia, obesity and diabetes. Practitioners prescribing OCs should be familiar with the following information relating to these risks. The information contained in the package insert is principally based on studies carried out in patients who used OCs with higher formulations of estrogens and progestogens than those in common use today. The effect of long term use of the OCs with lower formulations of both estrogens and progestogens remains to be determined. Throughout this labeling, epidemiological studies reported are of two types: retrospective, or case control, studies and prospective, or cohort, studies. Case control studies provide a measure of the relative risk of a disease, namely a ratio of the incidence of a disease among OC users to that among nonusers. The relative risk does not provide information on the actual clinical occurrence of a disease. Cohort studies provide a measure of attributable risk, which is the difference in the incidence of disease between OC users and nonusers. The attributable risk does provide information about the actual occurrence of a disease in the population. For further information, the reader is referred to a text on epidemiological methods.

1. Thromboembolic Disorders and Other Vascular Problems: a. Myocardial Infarction: An increased risk of myocardial infarction has been attributed to OC use. This risk is primarily in smokers or women with other underlying risk factors for coronary artery disease such as hypertension, hypercholesterolemia, marked obesity, and diabetes. The relative risk of heart attack for current OC users has been estimated to be two to six. The risk is very low under the age of 30. Smoking in combination with OC use has been shown to contribute substantially to the incidence of myocardial infarction in women in their mid thirties or older with smoking accounting for the majority of excess cases. Mortality rates associated with circulatory disease have been shown to increase substantially in smokers over the age of 35 and non-smokers over the age of 40 among women who use OCs. OCs may compound the effects of well known risk factors such as hypertension, diabetes, hyperlipidemia, age, and obesity. In particular, some progestogens are known to decrease HDL cholesterol and cause glucose intolerance, while estrogens may create a state of hyperinsulinism. OCs have been shown to increase blood pressure among users (see section 9 in WARNINGS). Similar effects on risk factors have been associated with an increased risk of heart disease. OCs must be used with caution in women with cardiovascular disease risk factors. **b. Thromboembolism:** An increased risk of thromboembolic and thrombotic disease associated with the use of OCs is well established. Case control studies have found the relative risk of users compared to nonusers to be 3.1 for the first episode of superficial venous thrombosis, 4 to 11 for deep vein thrombosis or pulmonary embolism, and 1.5 to 6 for women with predisposing conditions for venous thromboembolic disease. Cohort studies have shown the relative risk to be somewhat lower, about 3 for new cases and about 4.5 for new cases requiring hospitalization. The risk of thromboembolic disease due to OCs is not related to length of use and disappears after pill use is stopped. A two to four fold increase in relative risk of postoperative thromboembolic complications has been reported with the use of OCs. The relative risk of venous thrombosis in women who have predisposing conditions is twice that of women without such medical conditions. If feasible, OCs should be discontinued at least four weeks prior to and for two weeks after elective surgery of a type associated with an increase in risk of thromboembolism and during and following prolonged immobilization. Since the immediate postoperative period is also associated with an increased risk of thromboembolism, OCs should be started no earlier than four to six weeks after delivery in women who elect not to breast feed.

c. Cerebrovascular diseases: OCs have been shown to increase both the relative and attributable risks of cerebrovascular events (thrombotic and hemorrhagic strokes), although in general the risk is greatest among older (>35 years), hypertensive women who also smoke. Hypertension was found to be a risk factor for both users and nonusers. For both types of strokes, the relative risk of users compared to nonusers ranges from 2 for non-hypertensive users to 4 for users with severe hypertension. The relative risk of hemorrhagic stroke is reported to be 1.2 for nonusers who used OCs 2-6 for users with severe hypertension. The risk for 76 for smokers who used OCs 18 for nonusers and 257 for users with severe hypertension. The attributable risk is also greater in older women. **d. Dose-related risk of vascular disease from OCs:** A positive association has been observed between the amount of estrogen and progestogen in OCs and the risk of vascular disease. A decline in serum high density lipoprotein (HDL) has been reported with many progestational agents. A decline in serum HDL has been associated with an increased incidence of atherosclerotic disease. Because estrogens increase HDL cholesterol, the net effect of the balance achieved between doses of estrogen and progestogen and the nature and absolute amount of progestogens used in the preparation may be important in determining the cardiovascular risks of OCs. The amount of estrogen and progestogen in OCs is key in determining the cardiovascular risks of these preparations. For any particular estrogen-progestogen combination, the dosage regimen prescribed should be one which contains the least amount of estrogen and progestogen that is compatible with a low failure rate and the needs of the individual patient. New acceptors of OCs should be started on preparations containing the lowest dose of estrogen which has shown persistence of risk of vascular disease for ever users of OCs. In a study in the United States, the risk of developing myocardial infarction after discontinuing OCs persisted for at least 9 years for women 40-49 years old who had used OCs for 5 or more years, but this increased risk was not demonstrated in other age groups. In another study in Great Britain, the risk of developing cerebrovascular disease persisted for at least 6 years after discontinuation of OCs, although excess risk was very small. However, both studies were performed with OC formulations containing 50 micrograms or higher of estrogen.

2. Estimates of Mortality from Contraceptive Use: One study gathered data from a variety of sources which have estimated the mortality rate associated with different methods of contraception at different ages. These estimates include the combined risk of death associated with contraceptive methods plus the risk attributable to pregnancy in the event of method failure. Each method of contraception has its specific benefits and risks. The study concluded that with the exception of OC users 35 and older who smoke and 40 and older who do not smoke, mortality associated with all methods of birth control is low and below that associated with childbirth. However, smokers 35 and older, associated nonsmokers 40 and older who use OCs have an increase in mortality higher than those using other methods of birth control. These facts must be weighed against the proven benefits of the OCs. **3. Carcinoma of the Reproductive Organs:** Numerous epidemiological studies have been performed on the incidence of breast, endometrial, ovarian and cervical cancer, and the risk associated with subsequent pregnancy. The literature suggests that use of OCs is not associated with an increase in the risk of developing breast cancer regardless of the age and parity of first use or with most of the marketed brands and doses. The Cancer and Steroid Hormone (CASH) study also showed no latent effect on the risk of breast cancer for at least a decade following long term use. A few studies have shown a slightly increased relative risk of developing breast cancer, although the methodology of these studies, which included differences in exposure, duration of use, and differences in the risk of developing breast cancer, have been questioned. Some studies suggest that OC use has been associated with an increase in the risk of cervical intraepithelial neoplasia in some populations of women. However, there continues to be controversy about the extent to which these findings may be due to differences in sexual behavior and other factors. In spite of many studies of the relationship between OC use and breast and cervical cancers, a cause and effect relationship has not been established. **4. Hepatic Neoplasia:** Benign hepatic adenomas are associated with OC use, although the incidence of benign tumors is rare in the United States. Indirect calculations have estimated the attributable risk to be in the range of 33 cases/100,000 users a year, a risk that increases with duration of use. Rupture of rare, benign, hepatic adenomas may cause death through intraabdominal hemorrhage. Studies from Britain have shown an increased risk of developing hepatocellular carcinoma in long term (>8 years) OC users. However, these cancers are extremely rare in the U.S. and the attributable risk (the excess incidence) of liver cancers in OC users approaches less than one per million users. **5. Ocular Lesions:** There have been clinical case reports of retinal thromboses associated with the use of OCs. OCs should be discontinued if there is unexplained partial or complete loss of vision, onset of proptosis or diplopia, papilledema, or retinal vascular lesions. Appropriate diagnostic

and therapeutic measures should be undertaken immediately. **6. OC Use Before or During Early Pregnancy:** Risk of Birth Defects: Extensive epidemiological studies have revealed no increased risk of birth defects in women who have used OCs prior to pregnancy. Studies also do not suggest a teratogenic effect, particularly insofar as cardiac anomalies and limb reduction defects are concerned, when taken inadvertently during early pregnancy. The administration of OCs to induce withdrawal bleeding should not be used as a test for pregnancy. OCs should not be used during pregnancy to treat threatened or habitual abortion. It is recommended that for any patient who has missed two consecutive periods, pregnancy should be ruled out before continuing OC use. If the patient has not adhered to the prescribed schedule, the possibility of pregnancy should be considered at the time of the first missed period. OC use should be discontinued if pregnancy is confirmed. **7. Gallbladder Disease:** Earlier studies have reported an increased lifetime relative risk of gallbladder surgery in users of OCs and estrogens. More recent studies, however, have shown that the relative risk of developing gallbladder disease among OC users may be minimal. The recent findings of minimal risk may be related to the use of OC formulations containing lower hormonal doses of estrogens and progestogens. **8. Carbohydrate and Lipid Metabolic Effects:** OCs have been shown to cause hyperinsulinism, while lower doses of estrogen cause less glucose intolerance. Progestogens increase insulin secretion and create insulin resistance, this effect varying with different progestational agents. However, in the nondiabetic woman, OCs appear to have no effect or fasting blood glucose. Because of these demonstrated effects, prediabetic and diabetic women should be carefully observed while taking OCs. A small proportion of women will have persistent hyperglycemia while on the pill. As discussed earlier (see WARNINGS 1a and 1d), changes in serum triglycerides and lipoprotein levels have been reported in OC users. **9. Elevated Blood Pressure:** An increase in blood pressure has been reported in women taking OCs, and this increase is more likely in older OC users and with continued use. Data from the Royal College of General Practitioners and subsequent randomized trials have shown that the incidence of hypertension increases with increasing concentrations of progestogens. Women with a history of hypertension or hypertension-related diseases or renal disease should be encouraged to use another method of contraception. If women elect to use OCs, they should be monitored closely, and if significant elevation of blood pressure occurs, OCs should be discontinued. For most women, elevated blood pressure will return to normal after stopping OCs, and there is no difference in the occurrence of hypertension among ever and never users. **10. Headache:** The onset or exacerbation of migraine or development of new headache which is recurrent, persistent or severe requires discontinuation of OCs and evaluation of the cause. **11. Bleeding Irregularities:** Breakthrough bleeding and spotting are sometimes observed in patients on OCs, especially during the first three months of use. Nonnormal vaginal bleeding should be carefully monitored and appropriate diagnostic measures taken to rule out malignancy or pregnancy in the event of breakthrough bleeding, as in the case of any abnormal vaginal bleeding. If pathology has been excluded, time or a change to another formulation may solve the problem. In the event of amenorrhea, pregnancy should be ruled out. Some women may encounter postpill amenorrhea and dyspareunia, especially when such a condition was preexistent. **PRECAUTIONS: 1. Physical Examination and Follow-Up:** A complete medical history and physical examination should be taken prior to the initiation or resumption of OCs and at least annually during use of OCs. These physical examinations should include special reference to blood pressure, breasts, abdomen and pelvic organs, including cervical cytology, and relevant laboratory tests. In case of abnormal persistent or recurrent abnormal vaginal bleeding, appropriate diagnostic measures should be conducted to rule out malignancy. Women with a strong family history of breast cancer or who have breast nodules should be monitored with particular care. **2. Lipid Disorders:** Women who are being treated for hyperlipidemia should be followed closely if they elect to use OCs. Some progestogens may elevate LDL levels and may render the control of hyperlipidemia more difficult. **3. Use of OCs:** Some progestogens in any woman receiving such drugs, the medication should be discontinued. Steroid hormones may be poorly metabolized in patients with impaired liver function. **4. Fluid Retention:** OCs may cause some degree of fluid retention. They should be prescribed with caution, and only with careful monitoring, in patients with conditions which might be aggravated by fluid retention. **5. Emotional Disorders:** Women with a history of depression should be carefully observed and the drug discontinued if depression recurs to a serious degree. **6. Contact Lenses:** Contact lens wearers who develop visual changes or changes in lens tolerance should be assessed by an ophthalmologist. **7. Drug Interactions:** Reduced efficacy and increased incidence of breakthrough bleeding and menstrual irregularities have been associated with concomitant use of rifampin. A similar association, though less marked, has been suggested with barbiturates, phenylbutazone, phenytoin, salicylic acid, and possibly with griseofulvin, ampicillin and tetracyclines. **8. Interactions with Laboratory Tests:** Certain endocrine and liver function tests and blood components may be affected by OCs. a. Increased prothrombin and factor VII, VIII, IX, and X decreased antithrombin 3, increased non-specific induced platelet aggregability. b. Increased thyroid binding globulin (TBG) leading to increased circulating total thyroid hormone as measured by protein bound iodine (PBI), T4 by column or by radioimmunoassay. Free T3 resin uptake is decreased, reflecting the elevated TBG. Free T4 concentration is unaltered. c. Other binding proteins may be elevated in serum. d. Sex binding globulins are increased and result in elevated levels of total circulating sex steroids and corticoids; however, free or biologically active levels remain unchanged. e. Triglycerides may be increased. f. Glucose tolerance may be decreased. g. Serum bile levels may be depressed by OC therapy. This may be of clinical significance if a woman becomes pregnant shortly after discontinuing OCs. **9. Carcinogenesis:** See WARNINGS section 10. **10. Pregnancy:** Pregnancy Category X. See CONTRAINDICATIONS and WARNINGS sections. **11. Nursing Mothers:** Small amounts of OC steroids have been identified in the milk of nursing mothers and a few adverse effects on the child have been reported, including jaundice and breast enlargement. In addition, OCs given in the postpartum period may interfere with lactation by decreasing the quantity and quality of breast milk. If possible, the nursing mother should be advised not to use OCs but to use other forms of contraception until she has completely weaned her child. **INFORMATION FOR THE PATIENT:** See patient labeling. **ADVERSE REACTIONS:** An increased risk of the following serious adverse reactions has been associated with the use of OCs (see WARNINGS section). Thromboembolism, arterial thromboembolism, pulmonary embolism, myocardial infarction, cerebral hemorrhage, cerebral thrombosis, hypertension, gallbladder disease, hepatic adenomas or benign liver tumors. There is evidence of an association between the following conditions and the use of OCs, although additional confirmatory studies are needed: Mesenteric thrombosis, retinal thrombosis. The following adverse reactions have been reported in patients receiving OCs and are believed to be drug related: Nausea, vomiting, gastrointestinal symptoms (such as abdominal cramps and bloating), breakthrough bleeding, spotting, change in menstrual flow, amenorrhea, temporary infertility after discontinuance of treatment, edema, melasma which may persist, breast changes: tenderness, enlargement, secretion; change in weight (increase or decrease), change in cervical erosion and secretion, diminution in lactation when given immediately postpartum, cholestatic jaundice, migraine, rash (allergic), mental depression, reduced tolerance to carbohydrates, vaginal candidiasis, change in corneal curvature (steepening), intolerance to contact lenses. The following adverse reactions have been reported in users of OCs and the association has been neither confirmed nor refuted: Premenstrual syndrome, cataracts, changes in appetite, cystitis-like syndrome, headache, nervousness, dizziness, hirsutism, loss of scalp hair, erythema multiforme, erythema nodosum, hemorrhagic eruption, vaginitis, porphyria, impaired renal function, hemolytic uremic syndrome, Budd-Chiari syndrome, acne, changes in libido, colitis. While the following adverse reactions or conditions have been reported to be associated with the use of OCs, no causal relationship has been established: Congenital anomalies, Raynaud's disease, sickle cell disease, mitral valve prolapse, increased risk of developing venous thromboembolic disease among women with blood types A or AB, as opposed to women with blood type O. **OVERDOSEAGE:** Serious effects have not been reported following acute ingestion of large doses of OCs by young children. Overdose may cause nausea, and withdrawal bleeding may occur in females. **HOW SUPPLIED:** Loestrin 21/120 is available in dispensers each containing 21 tablets. Each tablet contains 1 mg of norethindrone acetate and 30 mcg of ethinyl estradiol. Available in packages of five dispensers. Loestrin Fe 120 is available in dispensers each containing 21 white tablets and 7 brown tablets. Each white tablet contains 1 mg of norethindrone acetate and 20 mcg of ethinyl estradiol. Each brown tablet contains 75 mcg ferrous fumarate. Available in packages of five dispensers. Loestrin 21/150 is available in dispensers each containing 21 tablets. Each tablet contains 1.5 mg of norethindrone acetate and 30 mcg of ethinyl estradiol. Available in packages of five dispensers. Loestrin Fe 150 is available in dispensers each containing 21 green tablets and 7 brown tablets. Each green tablet contains 1.5 mg of norethindrone acetate and 30 mcg of ethinyl estradiol. Each brown tablet contains 75 mcg ferrous fumarate. Available in packages of five dispensers.

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UPDATE

Limited HIV Screening May Not Work

Using a risk-assessment questionnaire to identify clinic clients at risk of human immunodeficiency virus (HIV) infection may be reliable only about half of the time, according to a recent Johns Hopkins study.¹ Of 1,060 women who registered for prenatal care at a Johns Hopkins obstetrics clinic, a total of 198 (19 percent) acknowledged in a screening questionnaire that they were at risk of HIV infection (i.e., that they or their sexual partner were currently using intravenous drugs or had done so in the past, had had intercourse with a bisexual male, had engaged in prostitution or had had a transfusion before April 1985). Two-thirds of these women agreed to be tested for HIV infection, and stored blood serum was available for about half of the remainder; 16 of the 164 admitted high-risk women whose serum could be evaluated were seropositive for HIV infection (10 percent). Serum samples were also available for 458 women who did not admit to any high-risk behavior; 14 (three percent) of these women were seropositive. Thus, of 30 women who tested positive for HIV infection at the start of prenatal care, nearly half had not admitted that they were at risk of infection. The researchers conclude that "as the prevalence of HIV infection among heterosexuals increases and diffuses across risk categories, current policies of offering HIV testing only to women with acknowledged risk factors will become increasingly inadequate."

1. M. B. Barbacci et al., "Human Immunodeficiency Virus Infection in Women Attending an Inner-City Prenatal Clinic: Ineffectiveness of Targeted Screening," *Sexually Transmitted Diseases*, 17:122, 1990.

FDA OKs Hormonal Implant

On December 10, the U.S. Food and Drug Administration (FDA) approved the marketing of NORPLANT®, a hormonal con-

traceptive implant system.¹ Six capsules 34 mm long inserted beneath the skin of a woman's upper arm release a steady, low dose of levonorgestrel for up to five years, providing continuous contraceptive protection over that period. The implant's first-year use-failure rate of 0.2 pregnancies per 100 makes it perhaps the most effective reversible method available. Although a substantial minority of users experience menstrual irregularities while using the device, most U.S. women who have tried the implants were pleased with them.² The FDA's announcement makes the United States the 17th country to approve the device for marketing; the implants have been tested in 46 countries since research began over 20 years ago.

1. "Wyeth-Ayerst Introduces NORPLANT System (Levonorgestrel Implants), an Alternative to Sterilization," press release, New York, Dec. 10, 1990.

2. P. D. Darney et al., "Acceptance and Perceptions of NORPLANT Among Users in San Francisco, USA," *Studies in Family Planning*, 21:152, 1990.

Best Embryos: Fresh or Frozen?

Frozen embryos are often used for in vitro fertilization, but cryopreservation and subsequent thawing appear to sharply diminish their ability to thrive.¹ Thirty-two Israeli women undergoing in vitro fertilization were asked to donate one-third of their eggs for use in similar procedures performed for 57 women who could not ovulate. After the donated eggs were fertilized, a total of 71 embryos were used immediately, while 91 were frozen for later use. A fresh embryo was successfully implanted in 17 instances (24 percent); the rate of successful implantation for frozen embryos was just eight percent. The physicians attempted in vitro fertilization for some of the women several times; the overall success rate per woman was more than twice as high for fresh embryos (37 percent) as for frozen embryos (15 percent).

The researchers comment that "at least in cases of egg donation, a better rate of pregnancy can be achieved...based on the transfer of fresh embryos."

1. D. Levran et al., "Pregnancy Potential of Human Oocytes—The Effect of Cryopreservation," *New England Journal of Medicine*, 323:1153, 1990.

Poor Outcomes for Tiny Infants

Only 22 percent of 184 infants born at a New York hospital between 1980 and 1985 who weighed less than 800 g survived long enough to be discharged from the neonatal intensive care unit, and the great majority of these children subsequently experienced serious developmental problems.¹ Of the 41 infants who had survived to be discharged, 28 were evaluated between 17 months and seven years later; of the remainder, four were known to have died, and most of the others could not be located. Just eight of the 28 children who were evaluated were considered developmentally normal (28 percent); 61 percent were suspected to have neurological problems and had IQ scores between 71 and 84; and 11 percent had cerebral palsy and IQ scores of 70 or less. Substantial proportions of the children were of very low weight and height, and a number were receiving special education or therapy or had residual physical problems. The researchers comment that their results "suggest that it may be difficult to effect improvements in morbidity among this group of smallest infants, despite refinements in neonatal intensive care."

1. E. G. Lipper et al., "Survival and Outcome of Infants Weighing <800 Grams at Birth," *American Journal of Obstetrics and Gynecology*, 163:146, 1990.

HIV Spread and Common STDs

Sexually transmitted diseases (STDs) that cause genital ulcers, such as chancroid and herpes, have long been suspected of in-

creasing the risk of human immunodeficiency virus (HIV) transmission, but preliminary results of an African study suggest that STDs such as gonorrhea and chlamydia may also increase this risk.¹ A study of nearly 500 prostitutes in Kinshasa, Zaire, compared 42 who became infected over the course of one year with a control group of 93 who did not. About five percent of women in each group had genital ulcers, but those who became infected with HIV were more than three times as likely as those who did not to be infected with gonorrhea or chlamydia. The investigator suggested that the latter infections may cause microscopic cervical ulcerations that could foster HIV transmission, or that such infections cause increased activity by T-cells and macrophages, the preferred targets of HIV.

1. P. Brown, "Common Sexual Diseases Could Increase Spread of HIV," *New Scientist*, Oct. 6, 1990, p. 21.

Deaths Rise Among Young Men

In the mid-1980s, mortality rates among U.S. men aged 25-44 ceased declining and began to increase, an increase that parallels the rise of human immunodeficiency virus (HIV) infection and AIDS.¹ Between 1980 and 1983, death rates declined from 205 deaths per 100,000 persons to 187 per 100,000 among whites and from 510 per 100,000 to 432 per 100,000 among blacks. However, by 1987, mortality rates among whites and blacks had risen to 204 and 514 per 100,000, respectively, the first such increases since well before 1970. Investigators estimate that in 1987, between 10,290 and 13,350 men aged 25-44 died of AIDS or AIDS-related conditions; without these deaths, overall mortality rates in this age-group would have continued their historical decline.

1. J. W. Buehler et al., "Impact of the Human Immunodeficiency Virus Epidemic on Mortality Trends in Young Men, United States," *American Journal of Public Health*, 80:1080, 1990.

The Low-Dose IUD

A five-year evaluation of a low-dose levonorgestrel-releasing IUD (the LNG 20) shows the device to be as effective as the most advanced Copper-T IUD (the TCu 380-Ag), although the hormonal device has a lower continuation rate.¹ The LNG 20 releases about 20 mcg of levonorgestrel each day (about one-third the amount released by the Progestasert, the only hormonal IUD approved in the United States). It was tested along with the TCu 380-Ag in a randomized, multicenter clinical trial involv-

ing more than 2,200 women. Life-table analysis revealed that over the first five years of use, failure rates for the LNG 20 and the TCu 380Ag were 1.1 and 1.4 pregnancies per 100 users; expulsion rates were significantly greater among users of the LNG 20 (11.8 per 100) than among users of the TCu 380Ag (7.4 per 100). The greatest difference between the devices, though, was in the women's experience of amenorrhea—rates of 19.7 per 100 and 0.4 per 100, respectively. However, users of the LNG 20 were significantly less likely than TCu 380Ag users to discontinue method use because of bleeding or pain (15.4 per 100 vs. 23.3 per 100). The continuation rate after five years was significantly lower among LNG 20 users (33.0 per 100) than among TCu 380Ag users (40.6 per 100). The investigators observe that the five-year cumulative pregnancy rates for both devices are lower "than have been reported in long-term randomized comparative trials for any reversible method of contraception."

1. I. Sivin et al., "Long-Term Contraception with the Levonorgestrel 20 Mcg/Day (LNG 20) and the Copper T 380Ag Intrauterine Devices: A Five-Year Randomized Study," *Contraception*, 42:361, 1990.

Sexual Abuse and STDs

Incarcerated adolescents who were sexually abused at some time in their lives are more than three times as likely as those who were not abused to be infected with gonorrhea or syphilis.¹ Among 2,521 teenagers admitted to a juvenile detention center in New York between 1983 and 1984, 136 were infected with gonorrhea or syphilis or both; these adolescents were contrasted with 136 age-matched uninfected controls from the same population. Thirty-two percent of infected females and eight percent of infected males reported that they had been raped or molested, compared with 14 percent of uninfected females and no uninfected males; thus, an adolescent who had been sexually abused was 3.4 times as likely to have become infected with gonorrhea or syphilis as one who had not. The researchers comment that even if childhood sexual abuse did not include actual intercourse, young people who were abused as children may be more likely than others to engage subsequently in unprotected intercourse with multiple partners, which may in turn increase their risk of contracting serious sexually transmitted diseases.

1. S. H. Vermund et al., "History of Sexual Abuse in Incarcerated Adolescents with Gonorrhea or Syphilis," *Journal of Adolescent Health Care*, 11:449, 1990.

Who Knows What a Pap Smear Is?

The typical female client of an inner-city sexually transmitted disease (STD) clinic may have had a Pap smear recently, but chances are she did not know what it was for.¹ In a sample of 116 black women aged 16-43 who visited an STD clinic in an inner-city area of Baltimore, 93 percent reported that they had had a Pap smear at some time in the past, but 33 percent admitted that they did not know its purpose. Of those who claimed that they did know, only 30 percent knew that it was for cancer detection, while nearly 50 percent believed it was to detect infection and nine percent believed it was a pregnancy test. Overall, only 21 percent knew what a Pap smear was for, including just 12 percent of 16-19-year-olds. The investigators observe that "the implications of this seemingly innocent lack of knowledge are potentially important," given that "if a patient is confused about the difference between the tests for pregnancy, cervical dysplasia and STDs, she may easily come to the wrong conclusion about appropriate treatment and follow-up." They conclude that patient counseling and education are an important component of care at STD clinics.

1. J. E. Horn et al., "Reproductive Health Practices in Women Attending an Inner-City STD Clinic," *Sexually Transmitted Diseases*, 17:133, 1990.

Evaluating the Cesarean Decision

Thirty percent of emergency cesarean sections performed at a British teaching hospital in 1985 were judged in a retrospective audit to have been unnecessary, and there was a high degree of disagreement among the evaluators regarding the need for many of the other cesareans.¹ Five physicians were asked to review the case records for 50 randomly selected emergency cesarean deliveries performed during 1985. In 15 cases (30 percent), at least four of the five doctors disagreed with the decision to perform a cesarean. Perhaps more important, they often disagreed over whether an individual cesarean delivery was necessary: In only eight cases did all five evaluators agree that the decision to order a cesarean delivery was justified, while in six cases all agreed that the decision to operate was unjustified. Furthermore, when the physicians reexamined the records of 40 of the 50 cases between three months and two years afterward, their assessment disagreed with their previous assessment 25 percent of the time.

1. J. F. R. Barrett et al., "Inconsistencies in Clinical Decisions in Obstetrics," *Lancet*, II:549, 1990.

Effects of State Welfare, Abortion and Family Planning Policies on Premarital Childbearing Among White Adolescents

By Shelly Lundberg and Robert D. Plotnick

Summary

This study develops an empirical model that measures the influence of state welfare, abortion and family planning policies on decisions concerning premarital pregnancy, abortion and single parenthood. Data are based on the fertility and marital experiences of white females from the three youngest cohorts of the National Longitudinal Survey of Youth, for 1979-1986. The results show that laws restricting contraceptive availability are associated with a higher risk of pregnancy. Restrictive policies on public funding of abortions reduce the likelihood of abortion, while greater availability of abortion services is associated with a higher likelihood that adolescents will obtain abortions. Finally, the estimates indicate that higher welfare benefits reduce the probability that pregnant adolescents will marry before bearing their children.

Introduction

The causes and consequences of adolescent premarital childbearing have received sustained attention from social scientists, public policymakers, advocacy groups and the public. There is consensus that the consequences are undesirable for mother, child and society in general and that reducing the number of premarital births is an important policy goal. Still, uncertainty

Shelly Lundberg is associate professor of economics, and Robert D. Plotnick is professor of public affairs and social work, University of Washington. This article was written while Lundberg was a visitor at the Industrial Relations Section, Princeton University, and Plotnick was a visiting scholar at the Russell Sage Foundation. The authors thank Robert Moffitt for sharing his data on AFDC, food stamp and Medicaid benefits, and Harriet Stranahan for providing research assistance. The study was supported in part by grant 88ASPE195A from the U.S. Department of Health and Human Services (DHHS), Office of the Assistant Secretary for Planning and Evaluation. The opinions expressed in this article are the authors' and do not necessarily reflect those of DHHS.

White teenagers living in states that have relatively restrictive policies on the public funding of abortions are less likely to terminate their first pregnancy than are adolescents living in states with more liberal regulations on abortion financing.

and controversy dominate discussions of the major causes and most promising remedial strategies.

The transition from virginity to premarital childbearing involves a multistage process of choices that may be implicit or explicit, active or passive.¹ A young woman chooses whether to initiate and continue sexual intercourse; whether to practice contraception and, if so, which method and how diligently to use it; whether to carry a pregnancy to term or abort it; and whether to marry the father (if this is a viable option), place the child for adoption, or raise the child as an unmarried mother.

To determine government's potential impact on the extent of premarital childbearing, participants in the policymaking process may consider laws and appropriation choices that affect the availability of contraceptives or the types and quantity of family planning services offered by publicly funded agencies. They may also review policies on sex education in public schools and decisions to fund media campaigns, counseling programs and parent-child communication efforts designed to influence teenage sexual behavior. Laws that place restrictions on public funding of abortions or the circumstances under which a pregnancy can be aborted are another possibility.

Other programs may influence premarital childbearing as an unintended side effect of their primary objective. The most prominent example is Aid to Families with Dependent Children (AFDC) which is usually augmented by the food stamp and Medicaid programs in which most AFDC recipients participate. Its main objective is

to provide income support to single parents with young children and with few or no alternative sources of income, yet by providing an independent source of income that is generally contingent on being unmarried, it may prompt some pregnant women to forgo marriage. Decisions made earlier in the sequence of choices, including those concerning contraceptive use and abortion, may also be influenced by the presence of AFDC if it raises a young woman's expected level of economic support as a single parent.

The research reported here provides new evidence about the effect of state welfare, family planning and abortion policies on premarital adolescent childbearing. Our empirical model divides the process leading to a premarital birth into three major stages: becoming pregnant; deciding either to abort or to carry the pregnancy to term; and, given the choice to carry to term, either remaining unmarried or marrying sometime before the birth. (We do not consider the choice between raising the child as an unmarried mother and placing it for adoption, since the placement option is now rarely exercised.) We analyze the choices using data for young white women in the National Longitudinal Survey of Youth (NLSY) and statistical methods appropriate for a set of interrelated choices such as these.*

The policies we examine affect the fi-

*We analyzed similar models for young black women. Because those findings differ markedly from the ones reported here (perhaps because of the severe underreporting of abortions by blacks in the NLSY) and raise a number of questions we have not yet resolved, they are not included. (See: reference 9.)

nancial and psychic benefits and costs of avoiding pregnancy, of obtaining an abortion, and of living as a single mother instead of marrying. Underpinning our analysis is the economic theory of rational choice, which focuses on the role of incentives and opportunity costs as important determinants of behavior.

To argue that the incentives created by public policies influence adolescent premarital childbearing is not to claim that such incentives fully explain this behavior. Nor does a focus on benefits and costs deny that social, cultural and attitudinal factors also influence these decisions. Rather, this approach suggests that such incentives do have an independent effect on premarital childbearing.

Methods

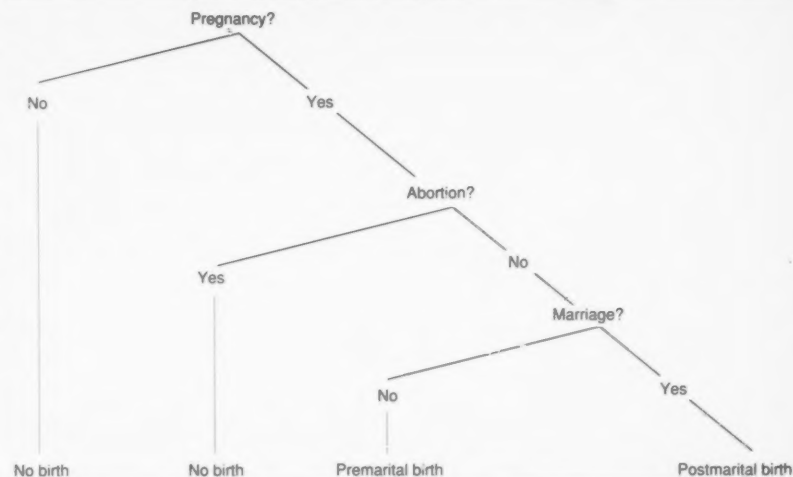
Figure 1 illustrates the sequence of choices and outcomes analyzed here. Since the abortion decision is conditional on the occurrence of a pregnancy and the marriage decision is conditional on continuing the pregnancy, the three stages of the decision process must be examined jointly. A three-stage nested logit model is an appropriate statistical method for estimating the determinants of such a hierarchical series of outcomes.²

The model can be analyzed in three stages, beginning with the lowest (the marriage decision). In the first stage, the probability of marriage, conditional on a pregnancy that is carried to term, is a function of variables affecting the relative value of a premarital and postmarital birth. The results from this stage are used to calculate an "inclusive value" for the carry-to-term option that carries over into the second-stage abortion decision. Thus, a variable that directly affects the marriage decision, such as the level of AFDC benefits, is also permitted to have an indirect effect on the probabilities of abortion and pregnancy. Similarly, policies affecting abortion availability will have a direct impact on the abortion probability and an indirect impact on the pregnancy probability through the "inclusive value" of options beginning with a pregnancy.*

The primary data source, the NLSY, is a multistage stratified probability sample of 12,686 persons aged 14–21 when first interviewed in 1979. Reinterviews have been conducted annually, with low attrition. The NLSY provides weights to adjust for the stratified nature of the sample. All results reported here incorporate these weights.

The sample for this study consists of 1,181 white females in the NLSY, aged

Figure 1. Outcomes of sequential decision-making in premarital childbearing



14–16 in 1979, who provided sufficient information on fertility and marital history for 1979–1986 to show whether and when they first became premaritally pregnant, whether they aborted or carried to term, and whether they married at some time between conception and delivery. Pregnancies ending in miscarriages are dropped from the sample for the abortion and marriage analyses since no explicit pregnancy resolution choice was made. We examine only first premarital pregnancies in this study.

Table 1 (page 248) presents basic statistics on the fertility and marital behavior of the overall sample, with and without adjusting for sampling weights. The weighted figures show a pregnancy rate of 24 percent for the entire sample period. About one in 10 pregnancies ended by miscarriage or stillbirth, and of the remaining pregnancies, more than one-third were aborted. Nearly half of the live births were to unmarried women. The net result was that 6.5 percent had a premarital birth. The unweighted figures show a slightly higher level of pregnancy, a lower level of abortion and, consequently, a higher level of premarital births (8.0 percent).

The reported abortion rate is about 90 percent of the actual white teenage abortion rate derived from vital statistics data and information compiled by The Alan Guttmacher Institute.³ Thus, the models of abortion choice and pregnancy are unlikely to be greatly affected by problems associated with underreporting. The rate of marriage among adolescents in the NLSY who become premaritally pregnant and do not abort is close to the vital statistics rate.

The sample used in each stage of the nested logit analysis drops respondents with missing values for any one of the explanatory variables in that stage or a prior stage. This reduced the weighted samples for analyzing pregnancy, abortion and premarital births to 997, 239 and 161 women, respectively, but the proportion of young women who became pregnant, the proportion of pregnancies ending in abortion and the proportion of births to unmarried mothers were similar to those found using the larger samples (24 percent, 38 percent and 44 percent, respectively).

The set of independent variables at each stage of the nested logit model consists of the policy variables obtained from published sources that may plausibly influence a young woman's choice at that stage and exogenous family background variables measured when each woman was 14 years old. In the marriage stage, the policy variable is the welfare benefits available if a young woman bears the child out of

*The standard multinomial logit model requires that individual errors in the value of each option be uncorrelated, which leads to an undesirable property known as "independence of irrelevant alternatives." The nested logit model relaxes this constraint, allowing alternatives at each level of the choice model to be "close to" one another. The choice model is not a completely general one, however, and the results are dependent upon our preferred choice sequence as described in Figure 1. For example, the marriage choice is assumed to be conditional upon the occurrence of a pregnancy and the decision not to abort and is independent of the observed and unobserved costs of abortion and pregnancy avoidance. It is this assumption that permits the determinants of the lower-level decisions to be summarized in the "inclusive value" that enters subsequent stages and avoids the computational burdens of a completely general model.

Table 1. Unweighted and weighted number (and percentage) of white women, premarital pregnancies and pregnancy outcomes, NLSY, 1979-1986

Pregnancies and outcome	Unweighted	Weighted
All women	1,181 (100.0)	4,543.4 (100.0)
Pregnancies	318 (26.9)	1,103.0 (24.3)
Stillbirths & miscarriages	39 (3.3)	122.1 (2.7)
Pregnancies to be resolved by choice	279 (23.6)	980.9 (21.6)
Abortions	88 (7.5)	363.7 (8.0)
Live births	191 (16.2)	617.2 (13.6)
Married mother	96 (8.1)	321.0 (7.1)
Unmarried mother	95 (8.0)	296.2 (6.5)

wedlock. In the results presented in Tables 2, 3, and 5, we measure these as the AFDC cash benefit (plus food stamps) provided to a family with no other income. We used the benefits for a family of four because these figures were readily available.

The policy variables in the second stage include three measures of the availability of abortion and of state funding policies for abortion. These measures vary by state and, where data are available, over time. The first measure is an index of state policy on the funding of abortions, ranging from one to four: One equals state funding for all or all medically necessary abortions, two indicates that the state is under court order to pay for abortions for medical and/or emotional reasons, three indicates that the state will pay only if full-term pregnancy may endanger the life of the woman or if the pregnancy is the result of rape or incest, and four is used when abortion costs are not paid by the state for any reason.* Because one expects women in states with higher values to be less likely to abort, one expects a negative coefficient for this variable.

The second measure is an index of the restrictiveness of state abortion laws.⁴ The index starts at zero and increases by one if abortion was legalized later than 1969; if, as of 1980, minors had to obtain parental

consent; and if second trimester abortions had to be performed in a hospital. The same value covers all years of the study; the maximum value is three. One would expect more restrictive policies (represented by higher values) to be associated with lower rates of abortion, resulting in a negative coefficient.

The third variable is an indicator of the availability of abortion, proxied by the percentage of the population living in counties with large providers of abortions as of 1980.⁵ One would expect a positive relationship between this variable and the likelihood of abortion. However, the relationship to abortion rates is unclear, since this measure may be a function of the demand for as well as the availability of abortion services.

The premarital pregnancy stage includes four measures of availability of and state policy on contraceptive services. These measures also vary by state and, where data are available, over time. Three measures indicate access to family planning services within the woman's state of residence. One is the percentage of teenage women who are at risk of an unintended pregnancy and who obtain family planning services.[†] The magnitude of such a variable depends both on the availability of such services and women's decisions to use them, and, therefore, is not truly exogenous to the behavior this study is modeling. Even so, the association with premarital childbearing is worth exploring. Two similar variables are the percentage of Medicaid-eligible women at risk of unintended pregnancy served by organized family planning clinics⁶ and the percentage of counties with family planning clinics serving fewer than 50 percent of low-income women at risk of unintended pregnancy in 1983.⁷ One would anticipate a negative coefficient for the first two variables and a positive one for the third.

The fourth variable is a dummy for the presence of state laws, regulations and policies that restrict the advertisement, sale, or licensing of contraceptives,⁸ with a value of one indicating the presence of at least one restriction. It is likely that such

Table 2. Percentage of white adolescents who marry prior to a birth, obtain an abortion and become premaritally pregnant, by state policy variable

Variable	%
Marriage variables	
Welfare benefits are	
Low	64.6
Medium	52.5
High	39.6
Abortion variables	
Abortion availability is	
Low	25.6
Medium	34.7
High	52.2
Public funding of abortion is	
Less restrictive	41.8
More restrictive	26.0
State abortion law is	
Less restrictive	39.6
More restrictive	31.6
Pregnancy variables	
State restricts contraceptive licensing, advertising or selling	
Yes	29.4
No	21.1
Proportion of counties in which family planning clinics serve <50% of low-income women at risk of unintended pregnancy is	
Low	20.0
Medium	25.7
High	27.1
Proportion of teenage women at risk of unintended pregnancy who obtain family planning services is	
Low	26.3
Medium	21.1
High	26.1
Proportion of Medicaid-eligible women at risk of unintended pregnancy served by family planning clinics is	
Low	24.4
Medium	23.2
High	25.9

restrictions most strongly affect teenagers. Such laws would tend to raise the costs of obtaining contraceptives, thereby reducing contraceptive use and increasing the likelihood of pregnancy.[‡]

We use the same set of background variables across all three stages. These variables capture differences in psychic benefits and costs and in family resources associated with outcomes at each stage. There are three dummy variables to measure

*Data for 1980, 1981 and 1985 were coded in identical fashion. We used 1980 data for observations from 1979-1980, and 1981 data for observations from 1981-1983; 1985 data were used for observations from 1984-1986. (See: R. Gold, "Publicly Funded Abortions in FY 1980 and FY 1981," *Family Planning Perspectives*, 14:204, 1982, Table 2; and R. B. Gold and J. Macias, "Public Funding of Contraceptive, Sterilization and Abortion Services, 1985," *Family Planning Perspectives*, 18:259, 1986, Table 3.)

†Data are available for 1979 and 1981. We used the

average of these two variables for 1980, and used 1981 values for later years. (See: A. Torres, J. D. Forrest and S. Eisman, "Family Planning Services in the United States, 1978-1979," *Family Planning Perspectives*, 13:132, 1981, Table 9; and A. Torres and J. D. Forrest, "Family Planning Clinic Services in the United States," 15:272, 1983, Table 5.)

‡A potential problem arises in determining what year to use when assigning values to states' family planning variables for the purpose of analyzing determinants of premarital pregnancy. For young women

who become pregnant, we could use the year they become pregnant, but it is not clear which year to use for women who do not become pregnant. To be consistent, we assign values for every woman in the sample based on the policies of her state of residence when she was 16. Once pregnant, each woman has three or four months to decide whether to abort or carry the pregnancy to term. Thus, for the abortion variables, we can assign values that applied in the year each woman became pregnant. Similar logic means we can assign values for welfare benefits for that year as well.

Table 3. Nested logit coefficients (and standard errors) measuring effect of policy variables on premarital childbearing, by category and variable

Category and variable	Coefficients
Marriage vs. premarital birth	
Welfare benefits (in \$100/mo.)	-.595** (.123)
Abortion vs. birth	
Abortion funding policy	-.268* (.106)
Restrictiveness of abortion law	-.080 (.136)
Abortion availability	.019** (.005)
Premarital pregnancy vs. none	
Contraceptive laws	.460** (.109)

*p<.05. **p<.01.

family structure: lived with mother and stepfather, with mother only or in a residual "other" structure. The omitted category is "lived with both natural parents." There are dummy variables for whether an adult female, usually the mother, worked in the paid labor force and for whether a foreign language was spoken at home. Variables for mother's education and number of siblings are included. There are dummy variables for religious identification: Protestant (excluding Baptist), Baptist, Catholic and Jewish or other. The omitted category is no religious identification. Religiosity is gauged by dummies for frequency of attendance at religious services: none, rarely or occasionally. The omitted category is frequently. In the pregnancy stage we include age of menarche; teenagers who reach physical maturity earlier may be more likely to begin sexual activity earlier, which would influence the probability of pregnancy. We also include a measure of predicted long-run wages associated with each fertility-marital outcome. This represents a key long-run "opportunity" cost of premarital childbearing.

Results

Table 2 displays the simple relationship between each policy variable and the likelihood of the outcome it would possibly influence. Since we did not control for other factors, the statistics are only suggestive of what the multivariate estimates will show and should not be viewed as tests of causal relationships.

In general, the relationships run in the directions one would expect. For example, there is a negative association between the amount of a state's welfare benefits and the likelihood that a pregnant adolescent who has a live birth marries before the birth. In states with low benefits, 65 percent of young women marry, as do 40 percent in states with high benefits.

All three indicators of abortion policy and availability are associated with the likelihood that an unmarried pregnant adolescent will obtain an abortion. Pregnant teenagers in states with relatively high availability are twice as likely to abort as those in states with relatively low availability (52 percent vs. 26 percent). States with less restrictive abortion laws or less restrictive policies on public funding of abortions have higher levels of abortion.

Twenty-nine percent of the young women living in states with restrictions on contraceptives become pregnant out of wedlock, compared with 21 percent in states with no restrictions. In addition, young women living in states with a high percentage of counties in which less than 50 percent of low-income women receive family planning services are more likely to become pregnant; the pregnancy rate was 27 percent in such states, compared with 20 percent in states with few such counties. However, greater use of family planning services by teenage or Medicaid-eligible women is not associated with lower rates of pregnancy.

Table 3 presents estimates from a multivariate nested logit model that is representative of the range of models we examined.⁹ For simplicity, we only show the coefficients on the policy variables and summarize findings from a series of alternative models. (We use the results to prepare illustrative cases showing how the probability of a premarital birth varies as policy variables assume different values.)

The coefficient for the state welfare benefit is significant at p<.01. The negative coefficient implies that higher welfare benefits reduce the likelihood that a pregnant teen will marry, increasing the likelihood that she will have a premarital birth.

To test the robustness of the findings on welfare benefits, we reanalyzed the marriage stage with three different measures in place of the AFDC and food stamp benefits. They are the cash AFDC benefit alone; the AFDC and food stamp benefits plus the expected value of the Medicaid benefits used by an AFDC family, measured at market prices; and the same three-program benefits, but with Medicaid benefits measured at their cash equivalent value.* We also ran the models after deflating the cash and food stamp measure by a state cost-of-living index and with the logarithm of the cash and food stamp measure in place of the level. The welfare measure's coefficient was positive and statistically significant at the five percent level or higher in all variations. This supports the finding that larger welfare benefits are related to a greater

Table 4. Nested logit coefficients (and standard errors) measuring effect of family planning variables on premarital pregnancy, by whether estimated singly or jointly

Variable	Singly	Jointly
Contraceptive laws	.460** (.109)	.329** (.096)
Family planning services for teenage women	-.001 (.004)	-.004 (.005)
Family planning services for Medicaid-eligible women	-.013** (.004)	-.007** (.003)
Low availability of family planning services	.011** (.003)	.004 (.003)

*p<.05. **p<.01.

likelihood of nonmarital childbearing among whites.

As Table 3 shows, we also found statistically significant effects of abortion policy and availability at the second stage. The negative coefficient on the "abortion funding policy" variable means that teenagers living in states with more restrictive policies on public funding of abortions are less likely to abort. The positive coefficient on the availability measure implies that greater availability is associated with a greater likelihood of aborting. The measure of restrictiveness of abortion law was not significant when included with the other two abortion variables. However, when entered as the only abortion variable in the model, it was significant, with the expected negative coefficient. Because these three variables represent sources of variation in the short-term cost between aborting and carrying to term, the findings provide further evidence that state policies do influence white teenagers' fertility behavior.

Finally, the results in Table 3 show that more restrictive laws on contraceptives are associated with a higher risk of pregnancy. We substituted the three other family planning variables in the pregnancy stage to see whether the findings were sensitive to the choice of policy indicator. When we enter each variable separately, as shown in Table 4, the coefficients on all three have the anticipated sign and two are statistically significant. When all four policy indicators appear in the same equation, all coefficients retain their signs, and two of the four are significant. Thus, evidence of a link between weak family planning ser-

*Medicaid benefits are deflated by the price index for medical care in T. Grannemann and M. Pauly, *Controlling Medicaid Costs*, American Enterprise Institute, Washington, D.C., 1983. We multiply Medicaid benefits by 0.37 to obtain their cash equivalent value, based on the estimate in T. Smeeding, "Alternative Methods for Valuing Selected In-Kind Transfer Benefits and Measuring Their Effect on Poverty," Technical Paper 50, U.S. Bureau of the Census, Washington, D.C., 1982.

Table 5. Probabilities of premarital pregnancy and of various pregnancy outcomes among white adolescents, by base case and variations of policy variables

Policy variable	Probability of pregnancy	Probability of birth	Probability of not marrying	Unconditional probability of premarital birth
Base case*	.163	.485	.256	.020
Base case except:				
Welfare=\$465/mo.	.165	.497	.149	.012
Welfare=\$693/mo.	.160	.465	.404	.030
Abortion funding index=4 (most restrictive)	.145	.616	.256	.023
Low abortion availability	.149	.579	.256	.022
Conservative abortion policy climate†	.134	.718	.256	.025
Liberal abortion policy climate‡	.200	.312	.256	.016
Some restrictions on contraceptives	.235	.485	.256	.029
Conservative welfare and reproductive policies**	.200	.728	.149	.022
Liberal welfare and reproductive policies††	.198	.296	.404	.024

*Lived with both natural parents, mother has 12 years of schooling, mother worked, three siblings, non-South residence and birth, no foreign language spoken at home, frequently attends religious services, Protestant, menarche at age 13, welfare benefits are \$579/mo., abortion funding index of 2, abortion law index of 1, 55 percent of population in counties that have large providers of abortion, no restrictions on contraceptives.

†Funding index=4, law index=3, large abortion providers=35%.

‡Funding index=1, law index=0, large abortion providers=75%.

**Same as †, plus welfare benefits=\$465/mo. and some restrictions on contraceptives.

††Same as ‡, plus welfare benefits=\$693/mo. and no restrictions on contraceptives.

vices and behavior leading to premarital childbearing appears robust.

Next, we illustrate the effects of changes in policy variables. This exercise shows how the probability of pregnancy, the conditional probability of carrying a pregnancy to term, and the conditional probability of bearing a child out of wedlock change as the policy environment changes. Multiplying these three probabilities yields the unconditional probability of having a premarital birth. Our findings should be viewed as illustrative: It would be premature to draw strong conclusions or offer policy recommendations based on the precise results of this exercise.

The base case assumes that the teenager lived with her mother and father when she was 14, has three siblings, attends religious services frequently (religious affiliation, non-Baptist Protestant) and was 13 years old at menarche; it also assumes that her mother completed high school, that an adult female in the household (usually her mother) worked when she was 14 and that no foreign language was spoken at home. We set the welfare benefit at the mean of \$579, the abortion funding policy index at two (slightly less restrictive than the mean), the abortion law index at one (also slightly less restrictive than the mean), the abortion availability index at the mean of

55 percent, and the dummy for restrictions on contraceptive sales and advertising at its modal value of zero.

The findings are shown in Table 5. For the base case, the probabilities of getting pregnant, carrying to term and not marrying before the child is born are .163, .485 and .256, respectively. The unconditional probability of becoming an unwed teenage mother is .020. (This is smaller than the sample statistic in Table 1. We use modal values for the base-case demographic variables, which generally represent characteristics less likely to be associated with a premarital birth.)

Table 5 also shows the effects on the probability at each stage and the unconditional probability of a premarital birth as we vary one policy variable or, in some cases, a combination of policy variables. All other variables remain at their base-case values. Lowering welfare benefits by one standard deviation, to \$465, lowers the likelihood of a premarital birth from .020 to .012. Raising them by the same amount increases the likelihood to .030.

The fourth row indicates that teenagers in states with the most restrictions on public funding of abortions are about 15 percent more likely than teenagers whose situations conform to the base case to become unwed mothers (.023 vs. .020). Greater

restrictiveness significantly raises the probability of carrying to term, as the coefficient from Table 3 had implied. Greater restrictiveness also lowers the probability of becoming pregnant. This is an indirect effect transmitted through the inclusive value, which links the series of outcomes in the nested logit method: As restrictiveness rises, the value of one of the outcomes associated with getting pregnant falls. Hence, the teenagers are less likely to become pregnant in the first place. The fifth row shows similar effects of lowering the availability of abortion (the percentage of population in counties with large providers of abortions) by 20 percentage points.

States with more restrictive values for one abortion-policy variable tend to have more restrictive values on the others. To assess the effect of the overall climate of abortion policy in a state, we predicted outcomes for a state with relatively restrictive values on all three abortion variables, shown in the sixth row of Table 5. The joint effect raises the unconditional probability of a premarital birth to .025, roughly double the change predicted for a single policy variable. The seventh row contains the findings for a state with more liberal values on all three variables and shows a decrease in the probability of a premarital birth to .016.

Restrictions on the sale and advertising of contraceptives raise the likelihood of becoming pregnant to .235, a jump of 44 percent. This implies a likelihood of premarital childbearing of .029.

The final two policy simulations compare predicted outcomes for teenagers living in typical conservative and liberal states. The conservative state has restrictive values on all abortion variables, restrictions on the sale and advertising of contraceptives, and low AFDC benefits; the opposite is true of the liberal state. The combinations of incentives favorable and unfavorable to becoming an unwed mother roughly cancel out. On net, our estimates show that the incentive not to marry created by higher AFDC benefits slightly dominates the incentives to avoid pregnancy and to abort, so the likelihood of premarital childbearing is marginally higher in the liberal state (.024 versus .022) than in the conservative state.

Comparison with Other Studies

Our findings are generally consistent with those of the two other studies that use data from the early 1980s to analyze similar policy variables. They differ from studies of data from the mid-1970s or earlier, which tend to find nonsignificant relationships.

White teenage behavior affecting the likelihood of premarital childbirth may have become more sensitive in recent years to incentives established by public policies.

Studies by Kristin Moore and Steven Caldwell and by Carl Serrato are most closely related to ours.¹⁰ They are the only others that use data on individuals, analyze determinants of premarital pregnancy and pregnancy resolution, and include policy variables. Moore and Caldwell's analysis of pregnancy shows that better family planning services do not reduce pregnancies among whites, while ours finds that they do. To analyze pregnancy resolution choices, they combine blacks and whites, and find greater availability of abortion is positively associated with the likelihood of abortion, as we do for whites. They report no effect of welfare benefits, which is inconsistent with our findings.

There are several possible reasons for the conflicting findings. Moore and Caldwell's data measure behavior from the late 1960s to 1971. Ours examine 1979-1986, a different social era and one that postdates *Roe v. Wade*. Responsiveness to policy variables may have changed. The studies also differ in statistical methods and in the measurement of policy variables.

Using a nested logit model, Serrato examines premarital pregnancy resolutions for a sample of the NLSY not restricted to young teenagers, but does not examine determinants of pregnancy. He examines slightly different measures of abortion availability and finds that they, too, significantly affect the probability of abortion. Living in a state that offers Medicaid-funded abortions increases the probability of an abortion for a pooled white and Hispanic sample, but has no significant impact for blacks. The number of high-volume abortion providers per 100,000 women in the state has a significant positive effect on abortions. (No race-specific effects were estimated.) Serrato also finds the expected AFDC payment has a large and significantly negative effect on the likelihood of marriage. The congruence between his findings and ours is reassuring but not surprising, since both studies draw from the same data base.

The other major studies that use data on individuals to assess the impact of public policies are by David Ellwood and Mary Jo Bane, Greg Duncan and Saul Hoffman, and Kristin Moore.¹¹ These studies examine determinants of nonmarital births without looking at the series of steps leading to this outcome. Only Moore analyzed abortion and family planning variables: She found very little evidence of an association

between these variables and teenage premarital childbearing.

All three studies fail to find any significant effects of welfare on the likelihood of having a premarital birth. Duncan and Hoffman's use of a black sample may account for their negative result. The null findings in the other two studies are based on data from the mid-1970s. (Studies of aggregate-level data that report similar findings also use data from the mid-1970s or earlier.) One can plausibly argue that by the 1980s, the stigma of premarital childbearing and the broad social controls that inhibited such behavior had declined. If social and psychological constraints on behavior have weakened, economic incentives may now have relatively greater influence on decisions leading to premarital childbearing. The results reported here, based on data covering 1979-1986, could reflect a shift towards greater sensitivity to financial incentives.

A study by Susheela Singh uses state-level data in an analysis of teenage pregnancy, abortion and birthrates in 1980 and their relationships to a variety of state policy, demographic, social and political characteristics.¹² States in which a high proportion of teenagers receive family planning services in clinics have lower birthrates but, surprisingly, do not have lower pregnancy rates. All of Singh's measures of abortion policy and availability are significantly associated with the abortion rate in the expected directions. In addition, greater availability of abortion is associated with higher pregnancy rates. These results closely match ours. However, the inherently small samples preclude simultaneous inclusion of many independent variables. In contrast to our results, Singh found that more generous AFDC benefits were not associated with higher rates of childbearing, but the data do not allow her to distinguish between marital and premarital outcomes. This finding would be consistent with a situation in which AFDC affects the marriage choice, but not the overall rate of teenage childbearing.

Conclusion

Do state welfare benefits, abortion policy and availability, and family planning policy and utilization influence the likelihood of premarital childbearing among white adolescents? Our findings suggest strong policy effects on pregnancy probabilities and on pregnancy resolution decisions.

The presence of accessible family planning services reduces the probability of premarital pregnancy. More liberal abortion policies increase the abortion rate of

premaritally pregnant young women. Higher welfare benefits raise the probability that pregnant adolescents who carry to term will not marry before giving birth. Pregnancy, abortion and marriage outcomes, therefore, are associated with policy variables in directions consistent with a "rational choice" model of behavior.

It is possible that state differences in policies, especially those concerning abortion and family planning, are serving to some extent as indicators of more fundamental differences in state attitudes and social mores on abortion, family planning and adolescent sexual behavior. Perhaps these hard-to-measure elements of the social reality exert the principal influences on adolescent behavior, in which case a structural interpretation of the coefficients on the policy variables would be inappropriate. If this effect is dominant, changing the policy parameters by, for example, federal legislation that overrides state preferences would in itself have little effect on premarital pregnancies. If, however, the policy variables really operate through changes in individual costs, then changing the policy parameters would tend to change individual behavior.

To argue that public policy incentives influence adolescent premarital childbearing is not to deny that social, cultural and attitudinal factors also influence this behavior. Rather, the findings bolster the view that responses to the perceived costs of individual behavior also play a role in the complex set of choices that result in adolescent premarital childbearing. For those interested in developing public policies to reduce premarital childbearing, evidence that incentives matter is good news. Our knowledge of how to change incentives is far from complete, but it is greater than our knowledge of how to change attitudes and culture.

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HIV/AIDS Knowledge and Sexual Behavior Among High School Students

By John E. Anderson, Laura Kann, Deborah Holtzman, Susan Arday, Ben Truman and Lloyd Kolbe

Summary

Data from the 1989 Secondary School Student Health Risk Survey indicate that 54 percent of all high school students in the United States had had some form of HIV/AIDS education in school. Responses to a questionnaire on HIV/AIDS knowledge show that nearly all students knew the two main modes of HIV transmission—intravenous drug use and sexual intercourse. Students who had been taught about HIV and AIDS in school gave correct answers to questions about the virus more often than those who had not received instruction. Students who knew more about HIV transmission were less likely to report having had two or more sexual partners and more likely to report consistent condom use.

Introduction

By the end of September 1990, more than 147,000 cases of AIDS had been reported in the United States;¹ some of these represent young adults who engaged in risk behaviors during their adolescent years. To control the spread of the AIDS virus, effective education programs aimed at adolescents are essential. This article reports data from the first nationally representative survey to assess knowledge of AIDS and of the human immunodeficiency virus (HIV) among high school students and to determine whether the students engage in behaviors that could affect their risk of HIV infection.

The data are from the Secondary School Student Health Risk Survey (SSSHRS), conducted by the Division of Adolescent and School Health of the Centers for Dis-

"A sizable minority of students continue to hold beliefs that may actually put them at risk—i.e., that birth control pills provide some protection against infection or that it is possible to tell whether people have AIDS by looking at them."

ease Control. This national survey formed part of a larger effort in 1989 in which the Departments of Education of 30 states, 10 cities and two territories also conducted surveys to evaluate HIV/AIDS education efforts by measuring knowledge, beliefs and behaviors among adolescents.² The same basic survey instrument was used in the national, state and local surveys. The survey contained questions on intravenous drug use as well as on sexual behavior, but this article presents only the findings on sexual behavior; the findings on drug use will be reported elsewhere.

Study Design and Methodology

For the SSSHRS, a national probability sample of students in grades nine through 12 completed self-administered questionnaires. The sampling frame, drawn from a national school data base known as Quality Education Data (QED), consisted of all high schools in the United States; the list was stratified to ensure that all regions as well as metropolitan and nonmetropolitan areas would be represented. Ninety-nine out of 122 selected schools participated in the survey, yielding a school response rate of 81 percent. Comparisons with the QED suggest that the schools participating in the survey were similar to all selected schools with regard to race, ethnic group, region and metropolitan or nonmetropolitan residence.³

One or two classes of any course from the required curriculum at the selected schools were chosen to participate, and all students in these classes were eligible for inclusion in the survey. Students completed the self-administered questionnaire

in their classrooms under the direction of trained data collectors. Every effort was made to ensure student anonymity.

Nearly all (96 percent) of the participating schools required parental consent; 10 percent of the eligible students did not receive it. An additional seven percent were absent on the day the survey was administered. Thus, of the selected students, 8,098 completed the survey, yielding a student response rate of 83 percent. To compensate for the missing students, weighting factors were developed within the categories of school, grade and sex.

First, we examined the relationship of sexual behavior items to HIV/AIDS knowledge and other background characteristics. Then, to see whether controlling for background factors affected the relationship between knowledge and behavior, we ran multiple logistic regressions with three dichotomous dependent variables: having ever had two or more sexual partners; having had two or more sexual partners during the past year; and always using condoms.* For the multivariate analyses of the number of sexual partners ever and in the past year, we chose to dichotomize the distribution at two or more partners since this number is most relevant in the spread of sexually transmitted diseases. In addition, we examined other ways of dichotomizing the number

*These variables were based on the responses to the following questions: With how many people have you had any kind of sexual intercourse in your life; with how many people have you had any kind of sexual intercourse in the last year; and whenever you have any kind of sexual intercourse, how often is a condom (rubber) used?

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of partners and found that if the category of three or more partners is designated as the category of interest, or even four or more partners, the relationship with HIV/AIDS knowledge does not change.

The final models were obtained using stepwise modeling techniques, with a $p < .05$ level of significance required for the inclusion of variables. Interaction terms between predictor variables were considered, but none were statistically significant in the final models.*

Results

Students were asked, "Have you been taught about AIDS/HIV infection in school?" Fifty-four percent of all students said that they had received some form of instruction. A slightly higher percentage of the 10th graders had had HIV/AIDS instruction (59 percent) than had the ninth graders (55 percent), the 11th graders (54 percent) or the 12th graders (47 percent). In addition, blacks (55 percent) and non-Hispanic whites (54 percent) were slightly more likely to have had HIV/AIDS instruction than were Hispanic students (51 percent).

The questionnaire contained 17 yes or no items regarding knowledge or beliefs about HIV transmission. The mean number of correct responses was 14.5. Table 1 lists the items and the percentage of students answering correctly. Nearly all students (98–99 percent) correctly identified the two most frequent modes of HIV transmission (i.e., sharing needles and having sex with an infected person). Ninety-one percent knew that HIV could be passed from a pregnant woman to her baby.

The responses to other items indicate that some students hold beliefs that could increase their risk of infection. For example, 12 percent believed that birth control pills provide some protection against HIV infection, and 23 percent thought it possible to tell whether a person was infected by looking at them. On the other hand, proportionally more students were misinformed about factors that do not increase risk: Thirty-six percent believed that donating blood could result in HIV infection, and 55 percent thought insect bites could transmit HIV.

Levels of knowledge about HIV and AIDS were significantly lower ($p < .05$) among ninth grade students than among students in each of the other grades: Ninth graders answered 14.1 questions correctly, compared with 14.5, 14.6 and 14.7 for 10th, 11th and 12th graders, respectively. Knowledge levels were also significantly lower among black and Hispanic students

(13.9 and 13.8 correct answers, respectively) than among white students (14.7). On average, students who reported receiving some form of HIV/AIDS education answered 14.9 knowledge items correctly, while those students who had had none gave correct answers to 14.0 questions. Although significant, the difference between the two groups is relatively small. Finally, females had a slightly higher number of correct responses than males (14.6 vs. 14.4, a statistically significant difference).

Fifty-seven percent of the students reported that they had ever had sexual intercourse, including 18 percent who had had only one partner, 10 percent who had had two, seven percent who had had three and 22 percent who reported four or more partners. Of the 52 percent who were sexually active in the year before the survey, 26 percent said they had had one partner in the past year, 10 percent reported two, six percent reported three partners and 11 percent reported four or more partners during the year.

About one-third of students who had ever had intercourse (18 percent out of 57 percent) reported that they always used condoms when having sex. Another 17 percent said they sometimes did, eight percent said they rarely did and 13 percent said they never did.

In Table 2 (page 254), we can see the relationship of sexual behaviors to potential confounding background factors and HIV/AIDS knowledge. As the table shows, 40 percent of all students said they had ever had two or more sexual partners and 28 percent said they had had two or more within the past year. Thirty-four percent of sexually experienced students reported that they always used a condom.

The percentage of students who had ever had two or more partners and who had had two or more in the past year increased with grade level. Most of the differences between grades were statistically significant ($p < .05$) except, for the past-year variable, those between ninth and 10th graders and between 10th and 11th graders. Compared with whites and Hispanics, black students were more likely to report having had two or more partners in both time frames, and males were more likely to have had multiple partners than females ($p < .05$). Students who had been taught about HIV and AIDS were significantly less likely to say they had two or more partners: The percentage in both time variables decreased with the number of correct responses to the HIV knowledge questionnaire ($r = -.05$ and $-.04$, $p < .05$).

Table 1. Number of secondary school students who answered HIV/AIDS knowledge questions and percentage who answered correctly, by question (and correct answer), 1989

Question	N	% correct
Can get AIDS from sharing needles (yes)	8,038	98.9
Can infect another person with HIV during sex (yes)	8,088	97.8
Can get AIDS from sex without a condom (yes)	8,086	97.7
Can get AIDS from holding hands (no)	8,092	96.3
Can reduce chance of infection by using condoms (yes)	8,078	93.1
Only gay men can get AIDS (no)	8,089	92.8
Can get AIDS from student in class (no)	8,090	91.2
There is a cure for AIDS/HIV infection (no)	8,088	91.1
Pregnant woman can infect unborn baby (yes)	8,090	90.7
Can reduce chance of infection by abstinence (yes)	8,081	89.1
Can reduce chance of infection by not having sex with IV drug users (yes)	8,085	88.3
Can reduce chance of infection by taking birth control pills (no)	8,079	88.0
Can tell if a person is infected by looking (no)	8,086	77.0
Can get AIDS from having a blood test (no)	8,085	74.3
Can get AIDS from public toilets (no)	8,080	72.0
Can get AIDS from donating blood (no)	8,088	64.0
Can get AIDS from insect bites (no)	8,086	45.1

Note: In this and subsequent tables, Ns differ because of missing data.

The percentage of students who always used condoms was significantly higher among ninth graders compared with each of the other grades ($p < .05$), and the difference in the rate of condom use between the 10th graders and the 12th graders was also statistically significant. In addition, male students were more likely to say they always used condoms than were female students (39 percent vs. 28 percent), and the proportion of all students who consistently used condoms increased with the number of correct responses to the knowledge questionnaire ($r = .06$, $p < .05$).

We conducted logistic regression analysis

*All tabulations and statistical analyses were performed with the SAS programming language using weighted data; statistical tests and confidence intervals are based on the procedures SESUDAAN and RTLOGIT that take into account the complex sample design.

Table 2. Number of students and percentage who had had two or more sexual partners; and number and percentage of sexually experienced students who always used condoms; all by demographic characteristics and HIV/AIDS knowledge

Characteristic and knowledge	N	≥ 2 partners		N	Always use condoms
		Ever	In past year		
Total	7,880	40.1	28.0	4,470	33.9
Grade					
9th	1,845	29.9	22.5	814	43.5
10th	2,018	35.2	25.4	1,025	36.9
11th	2,007	42.4	29.1	1,233	33.8
12th	2,010	52.3	34.6	1,398	26.4
Race/ethnicity					
White	4,997	38.5	27.0	2,738	36.1
Black	1,109	63.9	44.2	844	27.9
Hispanic	1,324	36.0	24.6	678	21.2
Other	443	28.5	19.3	206	30.3
Female	4,258	33.4	21.0	2,163	28.4
White	2,652	33.4	21.3	1,350	30.5
Black	614	47.5	28.7	417	23.8
Hispanic	771	23.5	14.7	302	13.0
Other	217	23.5	11.5	92	25.2
Male	3,615	46.7	34.9	2,301	38.6
White	2,343	43.5	32.6	1,386	41.1
Black	491	80.4	59.8	424	31.2
Hispanic	552	50.2	35.8	375	27.3
Other	226	32.4	25.4	114	33.8
HIV/AIDS knowledge					
Taught about AIDS	4,172	37.7	26.0	2,296	34.4
Not taught	3,705	42.9	30.2	2,171	33.4
No. of correct items					
<10	311	49.7	35.7	169	23.2
10-13	2,574	42.0	31.4	1,204	32.5
14-15	2,579	40.7	29.1	1,477	33.5
16-17	2,916	37.7	24.4	1,620	36.0

ses using each of the dichotomous behavior variables. The main purpose was to determine if two independent variables—having been taught about HIV and AIDS, and the number of correct responses to the knowledge questionnaire—lower the incidence of risky sexual behavior when background factors, namely, age, racial or ethnic group and sex, are controlled for. The results, which are shown in Table 3, include the independent variables and all of the confounding characteristics that were statistically significant at $p < .05$. The logistic regression coefficients are also given as odds ratios.

The level of knowledge significantly affected each of the three behaviors. For example, in the category of having ever had multiple partners, the odds ratio of 0.9 for the knowledge score indicates that for every additional knowledge item correct, the odds that the student will have had more than one sexual partner decrease by a factor of 0.9. There is a similar effect for the category of having had two or more partners in the past year. In the condom use category, the odds ratio indicates that the odds of always using a condom in-

crease by a factor of 1.1 for each correct knowledge item.

Having been taught about HIV and AIDS does not have a significant direct association with any of the three behavior items in the multivariate models. That is, once knowledge and background factors are controlled for, HIV/AIDS instruction is not associated with less risky sexual behavior. However, having received HIV/AIDS instruction is significantly related to knowledge about the virus (correlation coefficient $r = .21$, $p < .05$): Students who had been taught about HIV and AIDS gave, on average, 14.9 correct responses, compared with 14.0 among those who had no instruction. This difference of 0.9 more correct answers is related to a reduction in the odds by a factor of 0.95 and 0.93 of having multiple partners over the student's lifetime and in the past year, respectively. In addition, that difference is associated with an increase in the odds by a factor of 1.05 of always using condoms. Thus, these statistical models suggest that HIV/AIDS education may have an indirect effect on risk behaviors by increasing relevant knowledge.

Discussion and Conclusions

Although HIV/AIDS education is increasing in schools, it still is not offered to all students in all secondary schools, and the quality of the instruction is unknown. In 1988, 17 states required HIV/AIDS education; by 1989, that number had grown to 28.⁴

The survey data indicate that the vast majority of high school students know the main modes of HIV transmission. However, the data also indicate, as do surveys of teenagers in Massachusetts and the National Health Interview Survey of adults aged 18 and older,⁵ that a large proportion erroneously believe that donating blood and exposure to insect bites increase the risk of infection. More important, a sizable minority of students continue to hold beliefs that may actually put them at risk—i.e., that birth control pills provide some protection against infection or that it is possible to tell whether people have AIDS by looking at them. These misconceptions should receive more attention in future HIV/AIDS education efforts, so that students can make informed decisions about their risk-related behavior.

The results of the SSSHRS show higher levels of sexual experience than do other studies, particularly at the lower grades.⁶ This finding may be related to a number of factors, including the universe sampled, the questions used (e.g., "With how many people have you had any kind of sexual intercourse in your life?"), and the fact that the questionnaire was self-administered. Nonetheless, the SSSHRS data do exhibit the same patterns by age, sex and racial or ethnic group that have been observed in other studies.

Rates of condom use in the SSSHRS are more difficult to compare with those from earlier surveys, which asked about condom use at either first or last intercourse. For example, a recent study found that 57 percent of 15-19-year-old men used a condom at last intercourse.⁷ The SSSHRS finding that 39 percent of sexually experienced male students always used a condom was derived from the question "When you have any kind of sexual intercourse, how often is a condom (rubber) used?"

The results of the school-based sample can only be generalized to the adolescent population still in school. At the higher grade levels, the data become less representative of the general population in the same age-groups because drop-out rates progressively increase. Further, the sexual activity and characteristics of students in school are bound to differ from

those of young people who have dropped out.

The 1989 survey questionnaire was designed to be administered in a single class session. It therefore differs from the more detailed history obtained through personal interviews that is used in many of the reproductive health-related surveys. While the anonymity afforded by a self-administered questionnaire may increase honesty about sensitive items on sexual behavior, the lack of detail and specific routing patterns for responses may result in less accurate reporting on some items and in fewer opportunities for checking the consistency of responses.

A relatively small proportion (1.2 percent) of AIDS cases have been reported among 13–21-year-olds; about three-quarters of these adolescents probably became infected through sexual behavior or intravenous drug use.⁸ Data on these adolescent AIDS cases, however, do not accurately reflect the extent of the HIV epidemic among this population because the data mainly describe young people who were infected at an early age or who developed symptoms very rapidly. The estimated period between HIV infection and the onset of AIDS symptoms averages from eight to 11 years;⁹ thus, many of the persons with AIDS who are diagnosed in their 20s—21 percent of all reported cases¹⁰—probably acquired the virus during adolescence.

Evidence suggests that the incidence of AIDS is increasing in the adolescent and young adult age-groups. For example, between 1986 and 1987, AIDS moved from the seventh to the sixth leading cause of death in the 15–24 age-group.¹¹ Therefore, interventions and education programs that reduce risk behaviors among adolescents can have a large impact on the future of the AIDS epidemic. Although the SSSHS data do not allow us to make inferences about cause and effect, they clearly indicate that knowledge about HIV and AIDS is related to self-reported health behaviors, specifically having more than one sexual partner and always using condoms. Increasing knowledge and awareness of HIV and AIDS could therefore have an impact on sexual behavior, but alternative interpretations of the relationship between knowledge and behavior are also possible. For example, HIV knowledge scores may be correlated with variables such as intelligence, general academic performance, education and life plans, parental influence, peer norms and socioeconomic status. Because these variables were not measured in the current study, we

Table 3. Logistic regression coefficients and odds ratios of characteristics predicting sexual behavior among secondary school students, by behavior and characteristic

Variable	Coefficient	Odds ratio
≥ 2 partners over lifetime		
Knowledge score	-0.06	0.94
Taught about AIDS	-0.12*	0.89
Male	0.55	1.73
Age	0.34	1.41
White	0.58	1.79
Black	1.66	5.27
Hispanic	0.44	1.55
Intercept	-2.25	
≥ 2 partners in past year		
Knowledge score	-0.08	0.92
Taught about AIDS	-0.11*	0.90
Male	0.68	1.98
Age	0.24	1.27
White	0.32	1.38
Black	1.08	2.94
Intercept	-1.72	
Always use condoms		
Knowledge score	0.06	1.06
Taught about AIDS	-0.04*	0.96
Male	0.52	1.68
Age	-0.21	0.81
White	0.39	1.48
Hispanic	-0.38	0.69
Intercept	-0.88	

*Not statistically significant; all other coefficients significant at the $p < .05$ level.

Note: In the multivariate analyses, age was a continuous variable and knowledge scores were entered as the number of correct answers out of 17. All other variables were dichotomous and entered as one if the characteristic was present and zero if not. Whites, blacks and Hispanics were each compared with all others.

cannot assess their influence on the association between HIV knowledge and behavior.

Research has indicated that risk-related behavior may be changing among some groups. In a review of studies about behavior change related to AIDS, Marshall Becker and Jill Joseph concluded that as the AIDS epidemic has progressed, high-risk groups such as male homosexuals and intravenous drug users have modified their behavior, but there is less evidence of behavior change among adolescents.¹² However, other studies have demonstrated change,¹³ including a rapid increase of condom use among teenagers in the 1980s.¹⁴ Clearly, HIV-related risk behavior among adolescents needs further monitoring through school-based surveys such as the SSSHS.

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Variations in Fertility by Marital Status And Marriage Order

By Howard Wineberg

Summary

Analysis of data from the June 1985 Current Population Survey reveals that although marriage continues to be an important setting for childbearing, the strength of this relationship varies considerably by the mother's race, education and age at first birth. The largest proportion of white births occurs during first marriages, with the next largest group made up of remarital births; that pattern is reversed for black births. The proportion of births occurring during second marriages is twice as high among whites as among blacks; however, intermarital childbearing is more common among blacks than among whites. For both races, the number and proportion of all births that occurred in second marriages increased between 1973-1974 and 1983-1984; in the latter period, women who were in their second marriage had about 300,000 births a year. About half of all nonmarital births in 1983-1984—370,000 births a year—were of birth order two or higher.

Introduction

The structure of family life in the United States has changed tremendously over the past 25 years. The long-term rise in the rate of marital dissolution has been well documented,¹ as has the increase in the number of second marriages.² Marital fertility has declined, and nonmarital fertility has become increasingly common.³

Despite myriad studies on fertility in the United States, findings on nonmarital

The number and proportion of premarital births and of births in second marriages increased among both blacks and whites between 1973-1974 and 1983-1984, while the number and proportion of births in first marriages decreased.

births have rarely distinguished between births to never-married women and births to previously married women. Investigators making this distinction have generally done so as one aspect of a larger fertility study. A study on methodological options in measuring out-of-wedlock childbearing, published in 1975, tabulated the number of births to single, separated, divorced or widowed women in three California hospitals.⁴ A second study, published in 1985, examined levels of premarital and intermarital childbearing as part of a discussion of using the social definition of nonmarital births, which includes births to separated women (as opposed to the legal definition, which categorizes such births as marital).⁵ Another researcher distinguished between births to never-married women and those to formerly married women in a study that focused on children's experiences in single-parent families.⁶

Childbearing in second marriages has also received little attention. The high level of marital disruption, the lengthening of the duration between separation and remarriage⁷ and the high proportion of divorced women who remarry⁸ all suggest a need for more research on intermarital fertility and on childbearing in the second marriage.

The purpose of this study was to quantify variations in fertility according to the woman's marital status at childbirth. We made separate tabulations of data for births that occurred in 1973 and 1974 and for those that occurred in 1983 and 1984 so that we would be able to evaluate changes in childbearing over time. In addition,

we conducted separate analyses of birth data for white women and for black women.

Data and Methods

Our analysis is based on marital and fertility histories provided by all women aged 18-59 and by ever-married women aged 15-17 in the June 1985 Current Population Survey (CPS), which uses a probability sample selected to represent the civilian noninstitutionalized population of the United States living in households. The CPS collects marriage and birth histories that make it possible to determine a woman's marital status at childbirth. Comparisons with other surveys have shown that CPS birth data are of high quality.⁹ Furthermore, tabulations based on retrospective birth and marriage histories from the CPS are similar to those based on vital statistics data,¹⁰ and survey estimates of nonmarital births compare fairly well with vital statistics estimates.¹¹

Despite the overall high quality of CPS birth and marriage histories, there are questions of accuracy concerning the reporting of events that took place 20 years before the survey. To maximize recall accuracy and minimize truncation through mortality, our analyses are limited to births occurring in 1973, 1974, 1983 and 1984. We categorized marital fertility by marriage order and nonmarital fertility by whether the birth occurred before the first marriage (premarital), after disruption (through separation, divorce or widowhood) of the first marriage but before the second marriage, or after disruption of the second marriage but before the third marriage. In

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Table 1. Number of all births and percentage distribution of births, by mother's race and marital status at childbirth, according to mother's education, January 1973 to December 1974 and January 1983 to December 1984

Year, mother's race and marital status	All births		Years of education			
	Unweighted N	Weighted N*	<12	12	13-15	≥16
1973-1974						
All	(N=4,189)	(N=6,561,397)	(N=1,367,935)	(N=2,818,026)	(N=1,441,618)	(N=933,818)
Before 1st marriage	491	782,734	16.5	12.1	10.7	5.8
During 1st marriage	3,257	5,095,018	68.7	77.2	80.7	87.3
Between 1st marriage and 2nd marriage	203	320,640	8.0	4.5	4.3	2.3
During 2nd marriage	213	325,711	5.9	5.8	3.8	2.8
After 2nd marriage	25	37,294	0.8	0.4	0.6	0.7
White	(N=3,458)	(N=5,353,549)	(N=1,016,592)	(N=2,368,140)	(N=1,162,189)	(N=806,628)
Before 1st marriage	238	358,975	10.6	6.3	5.5	4.7
During 1st marriage	2,854	4,435,410	75.6	82.3	86.2	88.7
Between 1st marriage and 2nd marriage	147	228,187	6.3	4.4	3.4	2.6
During 2nd marriage	194	293,683	6.4	6.6	4.1	3.2
After 2nd marriage	25	37,294	1.1	0.4	0.8	0.8
Black	(N=551)	(N=965,221)	(N=290,133)	(N=369,297)	(N=235,029)	(N=70,762)
Before 1st marriage	236	406,605	38.1	50.1	36.9	34.6
During 1st marriage	254	448,971	42.7	42.5	52.3	63.9
Between 1st marriage and 2nd marriage	49	87,167	15.0	6.4	8.0	1.4
During 2nd marriage	12	22,478	4.2	1.0	2.8	0.0
After 2nd marriage	0	0	0.0	0.0	0.0	0.0
1983-1984						
All	(N=4,635)	(N=7,130,227)	(N=1,483,006)	(N=2,912,559)	(N=1,605,936)	(N=1,128,726)
Before 1st marriage	636	1,024,059	26.0	14.3	11.5	3.3
During 1st marriage	3,296	5,030,731	56.0	70.5	73.6	85.5
Between 1st marriage and 2nd marriage	233	372,396	6.7	5.6	5.3	2.1
During 2nd marriage	394	592,219	8.6	8.1	8.5	8.2
After 2nd marriage	76	110,822	2.6	1.5	1.0	0.9
White	(N=3,819)	(N=5,787,603)	(N=1,089,098)	(N=2,390,432)	(N=1,333,208)	(N=974,865)
Before 1st marriage	328	501,205	16.2	9.1	6.5	2.2
During 1st marriage	2,904	4,388,614	64.2	75.0	78.7	86.9
Between 1st marriage and 2nd marriage	168	273,221	6.7	5.3	4.1	2.0
During 2nd marriage	356	532,114	10.3	9.0	9.6	7.9
After 2nd marriage	63	92,449	2.5	1.7	1.1	1.0
Black	(N=595)	(N=1,038,533)	(N=306,958)	(N=440,445)	(N=208,520)	(N=82,610)
Before 1st marriage	275	492,564	65.8	42.0	44.8	14.7
During 1st marriage	236	407,879	20.9	45.8	39.9	71.1
Between 1st marriage and 2nd marriage	55	90,370	7.3	8.2	13.6	4.5
During 2nd marriage	21	36,064	4.4	2.9	0.8	9.7
After 2nd marriage	8	11,656	1.6	1.1	1.0	0.0

*In Tables 1 and 2, numbers have been weighted to represent distribution of women by marital status at childbirth in the United States.

this study, a birth to a woman who is legally married but separated from her husband is classified as nonmarital. Researchers commonly consider separation, rather than divorce, as the event that marks marital dissolution.¹² When birth and marital events occurred on the same date (this

happened about once for every 275 births), births were equally allocated as having occurred before or after the marital event.

Education has consistently been shown to be related to completed fertility and premarital fertility.¹³ Likewise, the timing and the level of fertility vary significantly

by race.¹⁴ Consequently, we categorize data on women's marital status at childbirth according to race and education.

Our data set does have limitations. The CPS collected birth histories for only the first four children and for the last child, which may be of any parity; consequently,

Table 2. Number of first births and percentage distribution, by mother's race and marital status at first birth, according to mother's education and age at first birth, January 1973 to December 1974 and January 1983 to December 1984

Year, mother's race and marital status	All births		Years of education				Age at first birth		
	Unweighted N	Weighted N	<12	12	13-15	≥16	<20	20-24	≥25
1973-1974									
All	(N=1,722)	(N=2,698,225)	(N=446,833)	(N=1,148,335)	(N=668,976)	(N=434,081)	(N=876,603)	(N=1,045,740)	(N=775,882)
Before 1st marriage	355	564,147	28.7	22.8	18.0	12.4	42.7	13.2	6.6
During 1st marriage	1,259	1,971,737	64.3	70.9	75.8	83.7	54.4	81.1	83.4
Between 1st marriage and 2nd marriage	50	91,284	4.7	3.6	3.4	1.6	2.5	3.4	4.3
During 2nd marriage	42	60,783	1.4	2.8	2.1	1.8	0.0	2.0	5.1
After 2nd marriage	6	10,274	0.8	0.0	0.7	0.5	0.4	0.2	0.6
White	(N=1,395)	(N=2,160,841)	(N=338,475)	(N=926,456)	(N=535,295)	(N=360,615)	(N=596,726)	(N=892,947)	(N=671,168)
Before 1st marriage	173	262,495	18.7	12.8	9.5	8.4	25.3	8.4	5.5
During 1st marriage	1,123	1,750,550	73.4	79.8	83.9	87.0	70.6	85.4	84.3
Between 1st marriage and 2nd marriage	52	78,617	4.9	4.0	3.4	1.9	3.5	3.6	3.8
During 2nd marriage	41	58,905	1.9	3.5	2.3	2.2	0.0	2.4	5.6
After 2nd marriage	6	10,274	1.1	0.0	0.9	0.6	0.6	0.2	0.7
Black	(N=247)	(N=428,158)	(N=85,321)	(N=192,258)	(N=106,097)	(N=44,482)	(N=253,705)	(N=116,675)	(N=57,778)
Before 1st marriage	168	287,928	68.9	72.8	62.4	51.4	85.0	51.0	22.0
During 1st marriage	72	128,191	27.0	25.4	32.8	48.6	15.0	45.9	63.5
Between 1st marriage and 2nd marriage	6	10,161	4.1	1.8	3.0	0.0	0.0	3.1	11.3
During 2nd marriage	1	1,878	0.0	0.0	1.8	0.0	0.0	0.0	3.2
After 2nd marriage	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1983-1984									
All	(N=1,863)	(N=2,906,891)	(N=452,463)	(N=1,199,100)	(N=728,918)	(N=526,490)	(N=597,343)	(N=1,126,433)	(N=1,183,195)
Before 1st marriage	395	629,175	37.8	23.9	19.6	5.6	49.2	22.2	7.2
During 1st marriage	1,298	2,011,055	54.1	67.2	70.0	85.5	48.1	69.9	79.1
Between 1st marriage and 2nd marriage	55	91,437	3.8	3.3	3.8	1.3	1.6	3.5	3.5
During 2nd marriage	106	161,626	3.9	5.1	6.1	7.3	1.1	4.0	9.3
After 2nd marriage	9	13,598	0.5	0.5	0.5	0.3	0.0	0.3	0.8
White	(N=1,591)	(N=2,457,514)	(N=347,140)	(N=1,030,822)	(N=612,748)	(N=466,804)	(N=440,355)	(N=948,771)	(N=1,068,388)
Before 1st marriage	239	362,584	28.7	17.0	11.5	3.8	35.8	16.4	4.6
During 1st marriage	1,197	1,855,649	62.7	72.9	77.9	87.7	61.1	75.2	81.7
Between 1st marriage and 2nd marriage	49	80,943	3.8	3.8	3.5	1.5	1.6	3.7	3.7
During 2nd marriage	98	146,777	4.8	5.8	6.5	6.6	1.5	4.6	9.1
After 2nd marriage	8	11,561	0.0	0.6	0.6	0.4	0.0	0.2	0.9
Black	(N=191)	(N=330,812)	(N=79,755)	(N=135,784)	(N=91,809)	(N=23,464)	(N=139,754)	(N=135,573)	(N=55,485)
Before 1st marriage	136	246,642	87.2	74.2	74.5	34.2	93.9	62.3	55.9
During 1st marriage	49	73,738	9.7	25.8	19.3	56.4	6.1	33.2	36.4
Between 1st marriage and 2nd marriage	4	6,914	1.5	0.0	6.3	0.0	0.0	3.6	3.7
During 2nd marriage	2	3,518	1.6	0.0	0.0	9.4	0.0	1.0	4.0
After 2nd marriage	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

we do not have complete birth data for women having six or more children. However, this should have little effect on the results, because few women have more than five children. (For example, only about two percent of the births in 1984 were of parity six or higher.) A second limitation of the 1985 CPS is its lack of birth

histories for never-married women aged 15-17; this results in an underestimation of premarital births occurring in 1983-1984 by about 135,000, according to vital statistics data. Finally, because of higher levels of cohabitation during the past 15 years,¹⁵ we would have liked to categorize non-marital births by whether or not a woman

was in a cohabiting union at the time her child was born, but data on cohabitation were not available from the CPS.

Results

Table 1 (page 257) shows the distribution of births occurring in 1973-1974 and 1983-1984 by the woman's marital status

when she gave birth. The results reported in each table are weighted to reflect the distribution of all births in the United States by marital status. The CPS estimate of the number of births in 1973-1974 is about four percent higher than the number recorded in the vital registration system; on the other hand, the CPS estimate of births in 1983-1984 is about 2.5 percent lower than the number recorded in the vital registration system. However, when births to never-married women aged 15-17 years are excluded from the 1983-1984 vital statistics totals, there is virtually no difference between the two sources. Moreover, in both periods, the two data sources are similar in their estimates of white births and of black births.

Overall, most births occur during first marriages, although the proportion has declined from about 78 percent in 1973-1974 to 71 percent in 1983-1984. Nonmarital births made up 21 percent of all births in 1983-1984, a figure that corresponds to estimates from vital statistics data.¹⁶ As was found in earlier studies,¹⁷ premarital births outnumbered intermarital births; about 70 percent of nonmarital births are premarital, i.e.—they occur to women who, at the time they give birth, have never been married (regardless of whether they eventually marry). In 1973-1974, approximately five percent of all births were to women who were in their second marriage, compared with eight percent in 1983-1984. Few births occurred after the dissolution of the second marriage, whether or not the woman married a third time. The number of marital births and nonmarital births occurring after disruption of the second marriage were recorded separately, but because of the small number of births in these two groups, they were combined into one category.

A woman's marital status at childbirth is strongly related to her educational level. During both time periods, there was an inverse relationship between education and the proportion of all births that were premarital or intermarital. In 1983-1984, for example, 26 percent of all births to poorly educated women were premarital, compared with three percent of all births to college graduates. However, although the proportion of all births occurring in first marriages was directly related to level of education, the proportion occurring in second marriages varied little by education.

In both periods, more than three-quarters of all births to white women occurred during first marriages. The proportion that were premarital and the proportion occurring during second marriages increased

over time, from seven percent and six percent, respectively, in 1973-1974, to nine percent in both categories in 1983-1984. Trends in the distribution of births by mother's marital status at childbirth varied by education: College graduates were the only group in which the proportion and the number of premarital and intermarital births were lower in 1983-1984 than in 1973-1974. Among whites, as in the population overall, education was positively related to the proportion of births occurring in first marriages and negatively related to births occurring premaritally and intermaritally.

Among blacks, the relationship between childbearing and marital status was substantially different. In 1983-1984, the number of black births that were premarital was larger than the number that occurred during first marriages (500,000 vs. 410,000). Another nine percent of black births during that period were intermarital, more than twice the proportion occurring to women in their second marriage.

Although the proportions of women in the various marital status categories at childbirth varied significantly by race, there was little racial variation in the relationship of education to marital status at childbirth. Among both blacks and whites, premarital fertility fell and births in first marriages rose with increasing levels of education. Moreover, the number and proportion of premarital births and of births in second marriages increased for both races between 1973-1974 and 1983-1984, and the number and proportion of births in first marriages decreased.

Table 2 shows the distribution of first births by the woman's marital status according to race, education and age at first birth. Because the results for the population overall and those for whites are similar, they will be discussed together. The majority of first births were to women in their first marriage, followed by those to never-married women. The proportion of first births occurring in second marriages more than doubled between 1973-1974 and 1983-1984 (from about two percent to almost six percent). Of all first births to white college graduates, the number and proportion that were premarital decreased between the two periods. However, the levels of premarital first births among women who were poorly educated and those who gave birth as teenagers were disproportionately high in both periods.

As in previous studies,¹⁸ the proportion of premarital first births was lower among women who were older or more educated

when they had their first child than among those who were younger or less educated. In 1983-1984, for example, 36 percent of first births to white teenagers were premarital, compared with five percent of those to white women who were 25 or older. In both time periods, age and education generally had a positive relationship to the proportion of first births occurring in first marriages and of those occurring in second marriages.

Among blacks, the vast majority of first births were premarital, followed by those occurring in first marriages; these two groups accounted for about 97 percent of all black first births. Higher levels of education and older age at first birth were associated with lower proportions of premarital births and higher proportions of first births occurring in first marriages; however, premarital first births were so common that in 1983-1984, they accounted for more than 50 percent of black first births in all but one of the seven education and age-at-first-birth categories—college graduates.

Many women may be having multiple nonmarital births. By subtracting the number of nonmarital first births shown in Table 2 from the total number of nonmarital births shown in Table 1, one can see that the number of nonmarital births of birth order two or higher has increased over time: There were almost 460,000 such births in 1973-1974, compared with about 750,000 in 1983-1984.* In the later period, about 50 percent of the nonmarital births were of birth order two or higher.

Discussion

Although marriage continues to be an important setting for childbearing, the strength of this relationship varies considerably by the mother's race, education and age at first birth. Consistent with tabulations from vital statistics data,¹⁹ CPS estimates of the number and proportion of births occurring outside of marriage rose between 1973-1974 and 1983-1984. By categorizing nonmarital births either as births to never-married women or as births to previously married women, we found that most nonmarital births occurred to women who had never been married at the time they gave birth; such births comprised about 62 percent of nonmarital births to whites and 84 percent of those to blacks.

These findings have important implica-

*Calculations using the numbers in the tables will overestimate higher order nonmarital births because the category "after second marriage" includes both marital and nonmarital births.

tions for social and health policy. In general, never-married mothers are younger and have had fewer years of education than previously married mothers, and consequently may have fewer social and economic resources. Moreover, never-married teenagers often receive inadequate prenatal care,²⁰ which may lead to serious maternal and child health problems. Finally, both previously married women and never-married women may need assistance in caring for their children, because families headed by single parents are more likely to live below the poverty level than married couples and their children.²¹

If an unmarried woman is cohabiting, her children may have the benefits associated with two parents. Childbearing by an unmarried cohabiting couple is beyond the scope of this paper, but it may be worthwhile for future researchers to examine if and how the lives of children born to a cohabiting couple differ from the lives of those born to a married couple.

In examining patterns of childbearing within marriage, we found that the proportion of births occurring in first marriages decreased between 1973-1974 and 1983-1984, while the proportion occurring in second marriages increased. In 1983-1984, women in their second marriage had about 300,000 births a year. Most women who give birth in their second marriage do so shortly after remarriage,²² so the couple must care for a newborn while adjusting to their marriage. In addition, because most women giving birth during their second marriage already have children,²³ many families will experience structural and relational complexities.

Because the timing of first births is likely to have an impact on women's life circumstances and those of their children, we looked at the relationships between age at first birth, educational level and marital status at first birth. Our data indicate that in 1983-1984, a disproportionately high number of first births to teenagers and to women with less than a high school education were to never-married women (49 percent and 38 percent, respectively). Overall, about 22 percent of the first births during that period were to never-married women; that proportion was 15 percent among whites and 75 percent among blacks. Since women who begin childbearing at an early age generally have lower savings, lower incomes²⁴ and less opportunity to develop outside interests and skills than women who delay their first birth,²⁵ these findings suggest that a substantial proportion of women may need help in caring for their children.

Whether changes in the distribution of births by marital status result predominantly from differences in the fertility rate or from the number of women in the various marital groups is beyond the scope of this paper. However, delays in marriage,²⁶ high levels of divorce²⁷ and increases in the number of second marriages²⁸ suggest that the reduction in the proportion of births occurring in first marriages and the increase in the proportion of births to single women and to women in their second marriage may result from more time spent single and in second marriages. Previous investigators have found little change over the past 15 years in the probability that remarried women would give birth during their second marriage²⁹ or that women whose marriage has been disrupted would have an intermarital birth.³⁰ An examination of vital statistics data on childbearing trends according to race reveals that premarital birthrates have decreased slightly among blacks since 1974, but have increased among whites.³¹

This study has furthered our knowledge of fertility in the United States by documenting the contribution of each marital group to overall fertility. Calculating the proportion and number of births by marital status provides information that can be used by policymakers to gauge the demands of social services for children and their parents. This article has briefly discussed some of the implications of the changing distribution of births according to women's marital status. Continued research is needed on these changes, particularly as they relate to the family environment in which children grow up.

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Evaluating the Impact of a Theory-Based Sexuality And Contraceptive Education Program

By Marvin Eisen, Gail L. Zellman and Alfred L. McAlister

Summary

A controlled field study involving 1,444 adolescent males and females 13–19 years of age was performed to compare a sexuality education program based on the health belief model and social learning theory with several publicly funded community-based and school-based interventions. Among males who had never had intercourse prior to participating in the study, those in the experimental program were more likely than those in the comparison programs to maintain abstinence over the next year; there was no program effect, however, among females. Among female adolescents who initiated intercourse after the start of the study, attendees of the comparison programs were more likely to have used an effective contraceptive at most recent intercourse and to have used an effective method more consistently than were those who attended the experimental program; no such association was seen among comparable young men. Both experimental and comparison programs significantly increased the consistent use of effective methods among teenagers who had been coitally active

"Programs of sexuality and contraceptive education as brief as 8–12 hours appear to help all participants increase their sexual and contraceptive knowledge [and] initiate and maintain relatively high levels of effective contraceptive use."

before attending the programs. Among males, however, when preintervention contraceptive efficiency was held constant, the experimental program led to significantly greater contraceptive efficiency during the follow-up year than did the comparison programs; among females, the two approaches produced an equivalent degree of improvement. Finally, prior exposure to sexuality education was associated with greater contraceptive efficiency at the one-year follow-up among almost all sexual-experience and gender groups, regardless of the type of intervention program attended.

Introduction

Sexuality education has taken on new urgency in recent years. Increasing numbers of births to unmarried teenagers, increasing numbers of coitally active teenagers and declining average age at first intercourse have all contributed to a wider acknowledgment of the need to teach teenagers early about responsible sexual behavior.¹ Moreover, the AIDS epidemic has made responsible sexual behavior a life-and-death matter.

The prevention of adolescent pregnancy, with its well-known health, social and economic consequences, and the prevention of sexually transmitted diseases (STDs) have become central goals of many sexuality education programs.² Publicly funded educational outreach and family planning programs targeted to teenagers are now in place or are being developed in a number of states and localities.³ For many public health administrators and policymakers, the issue is not whether these

services should be provided, but what type or types of services will be most effective. Program orientation, structure and content have become important considerations, because even well-constructed and carefully implemented programs may have little impact upon participants' ability to avoid pregnancy.⁴

However, there are remarkably few prospective, controlled studies available to help administrators and policymakers determine whether sexuality education affects the ability of individual participants to avoid pregnancy. A review of the primary prevention literature revealed only three published evaluations of specific sexuality or family life education curricula that had pretest-posttest designs and collected data that could be linked to changes in specific individuals' sexual and contraceptive behavior over time. In one study of a small sample of high school volunteers (the only one in which participants were randomly assigned to study groups), those who took part in classroom sex education presented in a small-group discussion format were using contraceptives more consistently six months later than were controls who had had no such sexuality education.⁵ In a second such study, seven separate short-term sexuality education programs were found to have had no consistent positive effects in delaying first sexual intercourse or in increasing effective contraceptive use compared with matched-sample controls 3–9 months later.⁶ A third study, which evaluated whether a program promoted the postponement of sexual intercourse among low-income eighth graders, showed that

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significantly more males and females who were exposed to the program remained abstinent through the ninth grade than did comparison teenagers from similar area schools; however, over a nearly two-year follow-up period, the program appeared to have had little effect on contraceptive use among adolescents who were coitally active prior to the start of the study.⁷

More outcome evaluation studies are needed for a public health effort as pervasive and as burdened with expectations as sexuality education is. To help those involved in funding sexuality education programs and to address some of the gaps in our knowledge of educational intervention efficacy, we conducted a controlled field study of a novel theory-based curriculum, the final phase of a demonstration project originally funded by the Texas Department of Human Services. In the study, the standard sexuality and contraceptive education outreach curricula of several community-based and school-based programs were compared with the experimental curriculum. The study design incorporated features often absent from earlier program evaluations, such as random assignment of participants, the use of diverse samples and the collection of longitudinal data.

The major objectives of the demonstration project were: to evaluate the impact of the experimental intervention with respect to participants' subsequent coital behavior, contraceptive use and pregnancy status; to assess the differential impact of the experimental program and of several publicly funded community-based and school-based interventions on participants differing in age, gender, race or ethnicity and previous sexual experience; and to evaluate the importance of concepts from the health belief model in mediating the young participants' subsequent preventive behavior.

We hypothesized that over the one-year follow-up period, adolescents participating in the experimental program would be less likely to initiate sexual activity, more likely to use effective contraceptives at first and most recent intercourse and more consistent in using effective contraceptives than adolescents in the comparison programs. We also assumed that the experimental model would not be equally effective with adolescents of all ages, genders, racial or ethnic groups and levels of sexual experience, or at all study sites. However,

there was little empirical basis for predicting the direction or magnitude of anticipated differences.

The Experimental Intervention

We developed a public health-oriented approach to adolescent fertility control based on combining elements of the health belief model and social learning theory.⁸ The health belief model, a psychological model pertaining to primary prevention,⁹ suggests that among other factors, the probability that an individual will undertake a particular preventive action (e.g., contraceptive use) is linked to a number of personal perceptions, including susceptibility to the problem, the seriousness of developing or contracting the problem, and the benefits and costs of undertaking the recommended preventive action. Social learning theory predicts that adolescents will be better able to avoid pregnancy if the intervention program gives them a chance to observe both appropriate and inappropriate types of behavior, participate in role-playing to learn appropriate ways of preventing pregnancy, and engage in guided practice with knowledgeable teachers.

Using the health belief model's conceptual framework, social learning theory, and issues raised in the adolescent sexuality literature,¹⁰ we developed and pilot-tested a 12-15-hour experimental curriculum.¹¹ This novel approach was intended to increase teenagers' awareness of the probability of personally becoming pregnant or causing a pregnancy; the serious negative personal consequences of teenage maternity and paternity; and the personal and interpersonal benefits of delayed sexual activity and consistent, effective contraceptive use. It was also designed to decrease the psychological, interpersonal and logistical barriers to abstinence or consistent contraceptive use.

The experimental program included four broad content areas: factual information, group discussion of factual information, group discussion of values, feelings and emotions, and discussion of decision-making and personal responsibility for one's sexual behavior.¹² All of this was communicated through a combination of lectures, simulations, leader-guided discussions and role-playing (including gender-role reversals). For example, we developed a board game and simulations of salient male-female interactions to help participants understand their susceptibility to pregnancy and the serious consequences of pregnancy as concretely as possible. These activities were reinforced

with "trigger" films showing teenage actors involved in sexual decision-making, as well as with discussions conducted by group leaders. In other activities, participants generated their own scripts for role-playing key sexual and contraceptive-related situations (e.g., learning to say "no" to sexual intercourse or unprotected sexual intercourse and learning to buy over-the-counter birth control methods in a drugstore).

Family planning agency educators and school staff who were to deliver the experimental intervention attended intensive two-day training seminars conducted by the study staff. These sessions used curriculum guides on reproductive biology and small-group discussions; a training manual covering the principles of the health belief model, social learning theory and small-group discussion; outlines of the content of the trigger films; and a videotape containing excerpts from several simulated group sessions between leaders and students. During the seminars, the curriculum materials and techniques were discussed at length, and the trainees tested the small-group curriculum components by engaging in role-playing with the study staff. Subsequently, study staff members were available by telephone for consultation, problem-solving and encouragement.

Selecting Service Delivery Agencies

The family planning service agencies that were to participate in the controlled field comparisons were selected from a pool of Texas organizations that performed sexuality education programming with state reimbursement agreements, and from among California organizations with innovative information and education programs. The director of family planning in the Texas Department of Human Services helped recruit eligible agencies in that state, and the chief of the California Office of Family Planning and the executive director of the California Family Planning Council referred us to potential program sites in California.*

Six family planning service agencies and one independent school district (representing a total of eight sexuality and contraceptive education programs) compared their own usual outreach program or classroom curriculum with the intervention program. Like the experimental program, each comparison curriculum generally covered reproductive biology, contraceptives, STDs and dating, as well as sexual values, norms and decision-making, in both lecture and group-discussion formats. The programs did so without specifically

*The state of California had no funding relationship with the demonstration project.

focusing on the teenagers' perceptions of their own susceptibility to and the seriousness of pregnancy, nor did they focus on perceptions of the benefits of and barriers to fertility control. Most included course handouts, films, class exercises and homework assignments. Several programs, including those in public schools, used commercially available curriculum materials; none used role-playing or role-reversal more than occasionally. In general, there appeared to be less active student involvement written into the comparison syllabi and curricula than into the experimental program.

The agency sample represents a relatively broad mix of service providers, ranging from an urban Planned Parenthood affiliate to rural health clinics. These are not representative of all agencies conducting publicly funded educational outreach, but they do seem typical of the agencies and programs operating around the country.* (A summary of study site characteristics, including descriptions of each agency and its location, the population served and sample characteristics, the structure and features of the various programs, the basis for random assignment and program staffing patterns, is presented in the Appendix.)

Each agency, using its usual methods, recruited a sample of clients from a variety of sources, including regular public school classes, remedial summer-school classes and summer work-study programs run with private industry support. The agencies had a targeted age-range (13–19 overall), but no requirements with respect to gender, race or ethnicity or whether or not participants had ever had intercourse. Study participants were randomly assigned to the experimental or comparison programs individually or by classroom units, depending on each study site's programming requirements and situational constraints.† In general, during the demonstration project, the agencies continued to provide outreach programming to their regular client groups and organizations—i.e., the same audience they serve under their reimbursement agreements or grants.‡ With the exception of the school programs, all had family income ceilings or served low-income, inner-city youth.

While on paper and in the pilot study, the health belief model approach included about four hours of reproductive biology and 8–10 hours of small-group discussions, this time commitment was more than that normally allotted to such topics in the comparison programs. The latter programs were conducted in the context of the client

Table 1. Percentage distribution of study participants at baseline interview, immediate follow-up and one-year follow-up, by characteristic

Characteristic	Baseline (N=1,444)	Immediate follow-up (N=1,328)	One-year follow-up (N=888)
Sex			
Female	52	52	54
Male	48	48	46
Age (at baseline)			
13–14	29	29	32
15–17	67	67	65
18–19	4	4	3
Race/ethnicity			
White	15	16	17
Black	24	23	22
Hispanic	53	52	51
Other	8	9	10
Living arrangement (at baseline)			
With both parents	58	58	56
With mother only	34	34	37
With father only	2	3	3
With neither	5	5	4
Previous receipt of sex education			
Yes	62	61	62
No	38	39	38
Program			
Experimental	50	50	52
Comparison	50	50	48
Study site			
1	34	36	35
2	7	7	9
3	7	8	9
4	14	11	14
5	17	18	15
6	15	14	14
7	6	6	4
Total	100	100	100

Note: Percentages may not add to 100 because of rounding.

organizations' regular, ongoing training or educational activities, meaning that across sites, the experimental program generally was allotted less time than had originally been envisioned—ranging from as few as eight hours (four two-hour sessions) to a maximum of 12 hours. Consequently, some agencies stretched or adjusted their regular programs in order to match the time devoted to covering the material in the experimental program. As indicated in the Appendix, the number and length of sessions in the comparison programs also varied by agency, but with few exceptions, the experimental and comparison programs were similar in terms of number and length of sessions.

The Adolescent Sample

Data were collected from individual participants at three points during the study period. The first was before their exposure to the intervention (baseline). Baseline

questionnaires contained standard demographic, background and educational items. Age at baseline was calculated in months from each participant's birthdate to the date of his or her initial interview. Once teenagers at each site had completed the intervention, they were retested on their sexual and contraceptive knowledge and perceptions in a final group-administered session (immediate follow-up). Finally, 12 months after the scheduled date of program completion, participants were reinterviewed individually to collect information on the program's impact (one-year follow-up).

Between June 1986 and August 1987, 1,444 adolescents aged 13–19 from Sites 1–7 completed the baseline interview, and 1,328 (92 percent) participated in all or part of an intervention and completed the immediate follow-up session. In keeping with our study design, agencies attempted to reinterview all adolescents who were exposed to any phase of the demonstration 12 months after the scheduled completion date of their particular intervention program, even if they did not actually finish it. Between July 1987 and September 1988, one-year follow-up interviews were conducted with some 888 participants (62 percent of the baseline sample and 67 percent of the immediate follow-up sample).

As Table 1 shows, 52 percent of the 1,444 baseline interviewees were female; 15 percent were white non-Hispanic, 24 percent were black, 53 percent were Hispanic and eight percent were Asian (including recent refugees from Cambodia, Laos and South Vietnam). Sixty-two percent reported having received some previous sexuality education. Thirty-seven percent reported that

*Data from one additional site, a Job Corps training program, are not included in this report because the age-range, marital status and previous parenthood status of the participants were substantially different from those of the teenagers at the other seven sites (see reference 31).

†In the agencies that conducted mandated sex education as part of summer work-study programs (sites 1 and 5), ad hoc classroom groups were formed arbitrarily on the basis of students' work schedules, then randomly selected; in the public schools (sites 2, 3 and 7), one of the two participating classes at each site was chosen randomly to receive the experimental intervention. (See the Appendix for further information.)

‡In exchange for recruiting all teenagers who took part in the study, organizing and coordinating data collection and the educational interventions, and delivering the actual intervention, the agencies were paid up to \$5,000, contingent on the number of teenagers they recruited and retained in the sample over the study period. At all sites except the school district, teenagers were paid for completing the one-year follow-up interview.

they had ever had sexual intercourse; 49 percent said they had practiced contraception at their most recent intercourse, and of those who had done so, 74 percent had used a condom. The teenagers who participated in the study were not representative of all teenagers needing or receiving sexuality education; however, they were probably representative of the ethnic mix of clients served in outreach programs run by agencies in the largely Hispanic areas of the states that were studied.

Analytic Approach

To assess program impact from baseline to the one-year follow-up, information on sexuality-related knowledge, beliefs and behavior was collected in the three interviews. Knowledge measures included knowledge of reproductive physiology; myths about pregnancy and sexuality, birth control and STDs; and the effectiveness of contraceptive methods and of means of STD prevention.¹³ Most items were modified, adapted or taken verbatim from existing knowledge questionnaires.¹⁴

We found no studies that directly assessed adolescents' health perceptions of fertility control. Therefore, new items intended to tap the four major perceptual components—susceptibility, seriousness, benefits and barriers—were written for the pilot study. Those items were subjected to extensive scaling and psychometric studies and were revised, with several new items added in the field study. In addition, at baseline, we measured the expectations of those who had never had intercourse that they would become sexually active in the next three months (five response categories ranging from "very unlikely" to "very likely," plus "not sure").

The baseline and one-year follow-up questionnaires contained measures of the major behavioral variables necessary to

assess the impact of the program on adolescents' coital status, contraceptive use and ability to avoid pregnancy, including whether participants used a contraceptive method at first and most recent intercourse, what method or methods were used and how consistently contraception was practiced before and after the adolescents' participation in the program. (Contraceptive consistency was measured by a single item with five response options—"never," "a few times," "sometimes," "most times" and "every time.") We also asked the teenagers (in the context of a series of questions pertaining to life planning, dating and sexual behavior occurring after the intervention) whether they or their partner had become pregnant.

Because of restrictions imposed by institutional review boards in Texas (which already had been greatly concerned about parental consent issues and the inclusion of 13- and 14-year-olds in the study), we were unable to determine either the participants' age at first intercourse or their number of sexual partners. However, we estimated age at first intercourse of participants who became coitally active during the 12-month follow-up period by adding six months (i.e., the midpoint of the 12-month follow-up interval) to their age at baseline.

Our overall plan of analysis involved a four-group approach: For each gender, we examined abstinence, transition to coital activity and initiation of contraceptive use among those who at baseline had never had intercourse, and we studied contraceptive behavior among those who at baseline had already had intercourse. This approach was adopted on theoretical as well as empirical grounds.

From a theoretical perspective, the mechanisms and explanations behind the initiation of some type of behavior are likely to differ from those that govern the maintenance or strengthening of that behavior.¹⁵ Adolescent fertility control is probably no exception. Issues surrounding the initiation of sexual intercourse and the beginning of contraceptive use are likely to differ from those involved in the maintenance of method use. We also believed it was necessary to determine if the treatment programs had a differential impact on the initiation of and maintenance of contraceptive use. Moreover, it seems likely that the determinants and dynamics of coital activity and contraceptive use differ in larger society for males and females; thus, we analyzed males' and females' fertility control behavior separately.

Empirically, psychological research has

clearly documented that past behavior is the best predictor of subsequent behavior under similar circumstances.¹⁶ Teenagers who were coitally active before participation in the intervention had a contraceptive history that will have influenced them at entry into the intervention and through the follow-up year; thus, we needed to take these histories into account. For those who at baseline had never had intercourse and who became sexually active during the follow-up year, there were no comparable contraceptive histories that could be brought to bear.

From questions on sexual intercourse and contraceptive behavior posed at the baseline and one-year follow-up, we determined such factors as the continuation of abstinence and the transition from never having had intercourse to sexual experience, as well as the use of, and changes in the use of, any contraceptives and of effective birth control methods* at first and last postintervention intercourse. Finally, as a summary measure of contraceptive efficiency, we computed a weighted composite index intended to assess the consistency with which teenagers used effective methods before and after the intervention.†

Using a stepwise multiple regression approach, we examined the relative contribution of age, race or ethnicity, family composition, educational aspirations, previous sexuality education and sexual and contraceptive knowledge and perceptions at baseline and immediate follow-up to several measures of sexual and contraceptive behavior. To determine whether the adolescents who at baseline had already become sexually active increased their use of an effective method or their overall contraceptive efficiency by the one-year follow-up, we performed significance testing (sign tests and paired t-tests) separately for males and females in the experimental and comparison groups. If there were increases, we then tested to see whether the experimental program was significantly more effective than the comparison programs when contraceptive use at baseline, demographic and background factors and belief and knowledge variables at baseline and immediate follow-up were controlled.

Preliminary Analyses

Before assessing the immediate and long-term impact of the programs across study sites, we conducted several preliminary analyses. First, to examine the extent to which our sample was representative of all adolescents, we compared our baseline data on 15–18-year-old females to nationally representative data on females of the

*Following the delineations used in the 1988 National Survey of Adolescent Males (see reference 17), the pill, the condom, the diaphragm, the sponge and foam or jelly were classified as effective methods; withdrawal, rhythm and douching were classified as ineffective methods.

†The contraceptive efficiency index for teenagers who at baseline had had sexual intercourse was computed as follows: Effective method use at first preintervention intercourse (no=0, yes=1) plus effective method use at most recent preintervention intercourse (no=1, yes=3) multiplied by consistency of method use at baseline (a range of 1–5). For all teenagers who by the one-year follow-up had had sexual intercourse, the index was computed as follows: Effective method use at first postintervention intercourse (no=0, yes=1) plus effective method use at most recent postintervention intercourse (no=1, yes=3) multiplied by consistency of method use at the one-year follow-up (a range of 1–5).

same ages from the 1982 and 1988 National Surveys of Family Growth (NSFG), and compared our data on the 15-18-year-old males to a national sample of males of the same ages from the 1988 National Survey of Adolescent Males (NSAM).¹⁷ We focused on the proportions reporting that they had ever had sexual intercourse or had used contraceptives, adjusting the national data to match the locally drawn samples on age and race or ethnicity and calculating specific between-sample differences on outcome variables using previously outlined methods.¹⁸

For blacks, whites and Hispanics, our 1986-1987 baseline sample contained virtually the same proportion of sexually experienced females (34.6 percent) as did the adjusted 1982 NSFG data (34.4 percent).¹⁹ However, our baseline proportion of sexually experienced females was significantly lower (34.6 percent vs. 40.7 percent, $p < .05$) than comparable estimates from the 1988 NSFG.²⁰ Among females who had ever experienced sexual intercourse, the baseline sample was significantly more likely than the 1982 national sample to have ever used any contraceptive method (69 percent vs. 58 percent, $p < .001$),²¹ but our sample was less likely than the 1988 national sample to have done so (69 percent vs. 82 percent, $p < .01$).²²

Among the males, the baseline sample included the same proportion of teenagers who had had intercourse (55 percent) as was contained in the NSAM (55 percent),²³ but our sample had significantly fewer individuals who had used an effective contraceptive method at last intercourse (35 percent vs. 62 percent, $p < .001$).²⁴ Thus, there is some evidence to suggest that within a comparable age-range (15-18), the baseline sample is similar to national samples, at least in terms of the percentage who had never had intercourse. However, our 15-18-year-old females and males both appeared to be at significantly greater risk of unprotected intercourse or use of an ineffective method than were females and males in the most recent national samples.

Next, we examined whether random assignment of participants to experimental and comparison programs resulted in generally equivalent treatment groups with respect to demographic and background characteristics, beliefs and knowledge, as well as sexual behavior. We found no significant differences in reported sexual behavior or contraceptive use between participants in the experimental and comparison programs.

Third, using discriminant function analysis, we determined what variables

distinguished the 888 teenagers who completed the one-year follow-up interview from the 555 who did not. The first set of discriminant analyses, which included all participants at baseline (regardless of whether they were coitally active), revealed that among the male participants, those who were younger, who at baseline had never had intercourse, whose sexual and contraceptive knowledge was greater at the immediate follow-up and who had attended the experimental program were more likely to have completed the one-year follow-up interviews. Among the females, those who were younger and who at baseline had cited more negative effects of a pregnancy in the near future were more likely to have completed the one-year follow-up.

A second set of discriminant analyses that included only the study participants who had been coitally active at baseline revealed straightforward results. Among males, baseline contraceptive use did not differentiate between those who had completed the one-year follow-up and those who had not; only younger participants and those who were part of the experimental group were more likely to have been reinterviewed 12 months later. Thus, males who had ever had sexual intercourse were more likely to have left the study sample by the time of the one-year follow-up, but they were not poorer contraceptive users than the sexually experienced males who remained. Among the females, no variables significantly (at $p < .05$) differentiated those who completed the one-year follow-up from those who did not.

Finally, before combining impact data across sites, we tested for differences between sites in contraceptive efficiency at the one-year follow-up among the seven comparison programs. Since no significant differences were found, we combined data from the various study sites.

Evaluation Results

• *Changes in knowledge and perceptions.* To determine whether the experimental and comparison interventions increased the sexual and contraceptive knowledge of the teenagers who participated in them, we compared knowledge scores at baseline and immediate follow-up separately within each treatment group (not shown). The 50 items in the knowledge test were worth one point each. At baseline, the grand mean of the sexual and contraceptive knowledge measures was 25.12 (standard deviation of 7.02); thus, the average adolescent in this age range answered about half of the questions correctly. At

the immediate follow-up, participants in the experimental intervention showed a mean increase of more than eight points (from 24.68 to 32.85, $p < .001$), while members of the comparison group showed a similar increase (from 25.55 to 32.36, $p < .001$). These increases, both greater than one standard deviation, represented an improvement of almost 20 percent. Thus, consistent with the results of other intervention studies,²⁵ participants in both types of programs showed a substantial increase in short-term knowledge over the 2-3 week course of lectures and small-group discussions.

We then examined differences in sexual knowledge scores at the immediate follow-up as a function of participants' intervention program and demographic characteristics, while controlling for baseline scores. The resulting regression equation was statistically significant: Participants in the experimental program had higher knowledge scores at the immediate follow-up than did those in the comparison group ($p < .05$); in addition, females exhibited greater knowledge than males at the immediate follow-up ($p < .001$).

We also assessed changes in the participants' health perceptions between baseline and immediate follow-up and the subsequent effects of these changes on their fertility control. All scales showed statistically significant improvements (from $p < .05$ to $p < .001$), but there were no significant differences between experimental and comparison programs on any scale. More important, the inclusion in each of the subsequent impact analyses of belief scales from the immediate follow-up did not appear to influence changes in participants' sexual experience or contraceptive use at the one-year follow-up, or to affect the pattern of multivariate results reported here. Therefore, findings related to the measurement of health beliefs will not be discussed further here.*

• *Maintenance of abstinence.* Among the 596 participants who at baseline had not had intercourse and who provided data on coital status at the one-year follow-up, 177 (30 percent) reported that they experienced first sexual intercourse in the follow-up period. Thus, 419 (70 percent) of these adolescents maintained abstinence over the follow-up period. In addition, 41 (15 percent) of the 270 who had reported at baseline that they had had intercourse

*A full description and analysis of the perception scales based on the health belief model used in this experiment will appear in a separate report, which is now in preparation.

Table 2. Beta and T-values predicting the likelihood that adolescent males initiated sexual intercourse between baseline and one-year follow-up, by significant variables (N=197)

Variable	Beta	T-value
Expectation of becoming coitally active in next 3 months†	0.181	2.52*
Black‡,§	0.170	2.14*
Hispanic‡,§	-0.161	1.96*
Sexual knowledge at immediate follow-up	-0.149	-2.09*
Intervention§	-1.77	-2.92**
Age-intervention interaction	1.74	2.86**
Adjusted R ²	.128	

*p<.05. **p<.01. †Yes=1, no=0.

‡Relative to whites.

§Experimental group=1, comparison groups=-1.

engaged in no coital activity during the follow-up year.

Across groupings by gender, age and race or ethnicity, there was no significant difference between participants in the experimental and comparison programs re-

garding the percentage who maintained abstinence over the follow-up year (71 percent vs. 70 percent). Females were more likely to remain abstinent than were males (77 percent vs. 61 percent, $p<.001$) when data were combined across program assignments, age and race or ethnicity. Age at the one-year follow-up was not significantly associated with the percentage who had initiated intercourse in the combined sample—27 percent of those under age 15, 30 percent of those aged 15–17 and 33 percent of those over age 17. Finally, race or ethnicity was not significantly associated with the proportion who remained abstinent—65 percent of whites, 62 percent of blacks, 72 percent of Hispanics and 76 percent of others. We also examined the maintenance of abstinence during the follow-up year in light of study participants' pre-intervention experience with sexuality education, but there was no significant difference in the percentage remaining abstinent between teenagers who reported having attended one or more sexuality education classes and those who reported having attended none (70 percent vs. 71 percent). Thus, our data indicate that receipt of previous formal instruction neither promoted nor retarded the initiation of sexual intercourse in the follow-up year.

The following multivariate analyses are limited to the 501 black, white and Hispanic teenagers who participated in all or part of the intervention at the seven sites; those classified as "other" race or ethnicity were excluded because of this group's great diversity of racial and ethnic groups and of English-language skills.

As we had hypothesized, male respondents who had participated in the experimental program were significantly more likely to have remained abstinent (64 percent) than were the comparison teenagers (56 percent) once demographic and background characteristics and knowledge at baseline and immediate follow-up were taken into consideration. Table 2 shows a least-squares regression model that best predicted continued abstinence at the one-year follow-up: The six significant variables were participation in the experimental program, nonblack race, Hispanic ethnicity, a lower expectation of becoming coitally active in the next three months, greater sexual knowledge at the immediate follow-up, and the interaction between treatment program membership and age at the one-year follow-up. Inspection of the adjusted group means (not shown) indicated that as of the one-year follow-up, males participating in the experimental program who had become coitally ac-

tive by that time were somewhat older than the comparison-group males. Almost 13 percent of the variance in the maintenance of abstinence was accounted for by this six-variable model. (Logistic regression analysis yielded an identical six-variable model.)

A single-variable model emerged as the best fit for the data for females. A lower expectation of becoming coitally active in the next three months significantly predicted continued abstinence among the females, but program assignment did not (73 percent in the experimental program vs. 78 percent in the comparison program). This one-variable model was statistically significant, but it accounted for only two percent of the variance in sexual abstinence at the one-year follow-up. (Once again, logistic regression results were virtually the same.)

Thus, males who participated in the experimental program were significantly less likely to have become coitally active than were comparison males in the follow-up year, while females in these two groups were equally likely to have done so. The one common predictor of the transition to coital experience among both genders was their personal expectation at baseline that they would become sexually active in the near future. Having received some sexuality education previously and being older at the one-year follow-up were not significant predictors for either gender. However, greater sexual knowledge at the immediate follow-up predicted males' continued abstinence; moreover, males exposed to the experimental intervention who reported becoming coitally active in the follow-up year were estimated to be older at first intercourse than those who participated in comparison programs and subsequently became sexually active.

• *Method use among those initiating intercourse during the follow-up year.* First, we assessed the ability of the experimental and comparison programs to promote the initiation and consistent use of effective contraceptive methods among the male participants. Table 3 shows that there were no significant differences according to treatment group, gender and race or ethnicity in the use of an effective method at first intercourse, use of such a method at most recent intercourse and contraceptive efficiency in the follow-up year. For example, about 55 percent of males in the experimental program and 65 percent of those in the comparison programs reported having used an effective method at their most recent coitus. Some 64 percent in the experimental program and 71 per-

Table 3. Percentage of adolescents initiating intercourse between baseline and one-year follow-up who had used an effective contraceptive* at first intercourse and at most recent intercourse, and mean contraceptive efficiency, by program, gender and race or ethnicity (N=153)

Program, sex and race/ethnicity	Use at first intercourse	Use at most recent intercourse	Mean efficiency†
Experimental	57	45	8.54
Males			
Total	64	55	9.98
White	63	75	12.25
Black	63	63	12.25
Hispanic	64	46	8.63
Females			
Total	49	35	6.95
White	44	33	6.33
Black	50	38	9.13
Hispanic	50	35	6.41
Comparison	67	65	12.04
Males			
Total	71	65	12.08
White	82	70	13.60
Black	83	67	14.50
Hispanic	53	60	9.13
Females			
Total	61	65	12.00
White	100	100	17.14
Black	50	83	13.67
Hispanic	50	44	9.29

*Effective methods are the pill, the condom, the diaphragm, the sponge and foam.

†A weighted composite of contraceptive consistency multiplied by use of an effective method at first and most recent intercourse.

cent in the comparison group had used an effective method at first intercourse. Thus, about 67 percent of the males who completed either intervention program reported having used an effective method at first intercourse, which compares quite favorably with the rate of effective method use at first intercourse in the 1988 NSAM.

After adjusting the NSAM sample to match our sample's distribution on estimated age at first intercourse and race or ethnicity, we found that the black, white and Hispanic intervention participants were marginally more likely to have used an effective contraceptive at first intercourse than the national sample (67 percent vs. 57 percent, $z=1.80$, $p<.10$).²⁶ However, this finding should be viewed cautiously, because our combined sample size (only 81 males) was relatively small.

We then examined program effects on contraceptive efficiency when the effects of demographic and background factors and sexual knowledge at baseline and follow-up are included. The left half of Table 4 presents the final step in this regression analysis for males; it shows that we continued to find no significant program effect on contraceptive efficiency. Only two variables were significant predictors of contraceptive efficiency: Participants who had had sexuality education classes in the past were more efficient contraceptive users than were those who had not, while Hispanics who became sexually active in the follow-up year were significantly less efficient contraceptive users than were their black and white peers (who did not differ from each other). These two variables accounted for about 15 percent of the variance in contraceptive efficiency.

Among the females, we found that participants in comparison programs reported significantly greater contraceptive use after initiating sexual intercourse (Table 3). For example, 35 percent of teenage women from the experimental program reported using an effective contraceptive method at their most recent intercourse, compared with 65 percent of those from the comparison groups ($p<.05$). Likewise, over the follow-up period, the contraceptive efficiency of the young women who participated in the experimental program was significantly lower than that of female adolescents who took part in the comparison programs (6.95 vs. 12.00, $p<.01$). In addition, we determined incidence rates for use of an effective contraceptive method at first intercourse; however, for this measure there was no significant difference between the teenagers from the experimental program and those from the comparison pro-

Table 4. Beta and T-values predicting contraceptive efficiency among adolescents who initiated intercourse between baseline and one-year follow-up, by significant variable and sex, according to stepwise regression

Variable	Males (N=80)		Females (N=66)	
	Beta	T-value	Beta	T-value
Age			.269	2.57**
Hispanic†	-.253	-2.39**		
Family composition‡			-.220	-2.15**
Previous sex education§	.281	2.66**	.196	1.94*
Sexual knowledge at immediate follow-up			.306	2.99***
Intervention group††			-.335	-3.22***
Adjusted R ²	.152		.341	

* $p<.10$. ** $p<.05$. *** $p<.01$.
†Yes=1, no=0, relative to all others.
‡Lived with both parents=2, lived with one parent=1, lived with neither parent=0.
§Yes=1, no=0.
††Experimental program=1, comparison programs=-1.

gram (49 percent vs. 61 percent). We then combined the two groups and compared the young women's rate of effective contraceptive use at first intercourse with the rate reported in the 1988 NSFG. After we had adjusted the NSFG sample to match our sample distributions for estimated age at first intercourse and race or ethnicity, we found no difference in first contraceptive use between our combined group of 15-18-year-olds and national estimates (54 percent vs. 57 percent).²⁷ Again, these findings must be interpreted cautiously because of small sample size—only 73 female teenagers had initiated intercourse during the follow-up year.

We next determined whether the bivariate differences in contraceptive efficiency remained when other salient variables were included in the analysis. The results, on the right side of Table 4, show that the enhanced contraceptive efficiency in the comparison groups remained in the multivariate results ($p<.01$). There were also significant effects for older current age, previous receipt of sex education, greater sexual knowledge at the immediate follow-up (with baseline knowledge controlled) and residence with only one parent at baseline. Together, these five variables accounted for about 34 percent of the variance in contraceptive efficiency.

To summarize, patterns of contraceptive initiation and use among teenagers who at baseline had never had intercourse differed greatly by treatment group for males and females. Among the males, there was no significant difference in the effectiveness of the two types of programs; among the females, the comparison programs were more effective than the experimental program. Interestingly, though, when we

examined the method that comparison females used at their most recent intercourse, we found only 30 percent of users to have relied on the pill, while another 10 percent relied on both the pill and the condom and 60 percent on the condom alone. Finally, among the females, sexual knowledge at the immediate follow-up was a significant predictor of contraceptive efficiency at the one-year follow-up, independent of the type of program the young women had attended. This finding is especially important because it is the first report of a direct link between immediate postintervention sexual knowledge and subsequent contraceptive behavior in a prospective study.²⁸

• *Method use among those already sexually active at baseline.* Table 5 (page 268) shows mean contraceptive efficiency at baseline and one-year follow-up by intervention, gender and race or ethnicity of participants who had already had intercourse before the start of the study. Among males in the experimental program, contraceptive efficiency improved by about three points (from 8.51 to 11.91, $p<.005$). However, an improvement between baseline and one-year follow-up in the use of an effective method at most recent intercourse (from 56 percent to 64 percent, not shown) did not reach statistical significance. Among participants in the comparison programs, there was marginal improvement in contraceptive efficiency (from 7.48 to 9.46, $p<.10$), but it was not as large as in the experimental group. As was the case for participants in the experimental program, there was no significant improvement in effective contraceptive use at most recent intercourse (51 percent at each time).

Because of the statistically significant

increases in contraceptive efficiency among males in each program, we tested whether participation in the experimental program led to greater contraceptive efficiency at the one-year follow-up than participation in the comparison programs, net of other relevant variables. Table 6 presents the final stepwise regression model, which contains five variables. Participants who were more efficient contraceptive users at baseline, who had greater sexual and contraceptive knowledge prior to the program, who were non-Hispanic, who lived with both parents at baseline and who participated in the experimental intervention were more efficient contraceptive users at the one-year follow-up. As Step 1 shows, approximately eight percent of the variance in contraceptive efficiency at the one-year follow-up was accounted for by contraceptive efficiency at baseline.

Adding in baseline sexual knowledge, ethnicity and living arrangements more than doubles the initial R^2 (Step 2, $p < .01$), and exposure to the experimental program contributes an additional three percent to the total variance explained (Step 3, $p < .05$). Thus, demographic factors, prior sexual knowledge and program group more than doubled the influence of baseline contraceptive behavior alone. Together, the five variables accounted for about 18 percent of the variance in contraceptive use at the one-year follow-up.

Table 5 also presents the mean baseline and one-year follow-up contraceptive efficiency scores for the female study participants. Those in the experimental program showed no significant improvement between the two time-periods in efficiency scores (from 8.51 to 9.94) or in the use of an effective method at most recent intercourse (from 49 percent to 53 percent, not shown). Teenagers in the comparison programs experienced some improvement in contraceptive use over time, with contraceptive efficiency increasing from 8.63 to 11.22 ($p < .05$), although effective contraceptive use at most recent intercourse did not improve significantly (from 48 percent to 61 percent).

A stepwise multiple regression analysis of the data for the female participants indicated that contrary to our hypothesis, the experimental program was not more effective than the comparison programs in bringing about greater contraceptive efficiency at the one-year follow-up. A two-variable model that included contraceptive efficiency prior to the intervention (Step 1, $R^2 = .132$) and previous receipt of sexuality education (Step 2, $p < .05$) indicated that those who were more efficient

Table 5. Contraceptive efficiency scores at baseline and at one-year follow-up among adolescents who had initiated intercourse prior to intervention, by program, gender and race or ethnicity (N=220)

Variable	Baseline	One-year follow-up
Experimental	8.51	11.06
Males		
Total	8.51	11.91
White	14.67	18.00
Black	9.25	13.18
Hispanic	6.65	9.58
Females		
Total	8.51	9.94
White	9.55	13.09
Black	10.33	10.40
Hispanic	6.83	8.13
Comparison	8.03	10.40
Males		
Total	7.48	9.46
White	7.44	8.89
Black	7.45	11.50
Hispanic	7.52	7.76
Females		
Total	8.63	11.22
White	10.22	12.11
Black	10.68	13.79
Hispanic	5.67	8.56

contraceptive users at baseline and those who had been exposed to sexuality education before the demonstration project began were more efficient contraceptive users one year after the program was conducted (adjusted $R^2 = .174$).

Based on the multivariate findings for male adolescents who at baseline had already had sexual intercourse, the experimental intervention appears to have been more effective than the comparison programs when preintervention contraceptive use was held constant. Thus, participation in the experimental program added significantly to the variance in males' contraceptive use at the one-year follow-up explained by their baseline contraceptive behavior and by demographic factors. Among the females who had had intercourse prior to the study, exposure to the experimental program did not contribute significantly to contraceptive efficiency at the one-year follow-up, but previous receipt of sexuality education did. Finally, Hispanic ethnicity was an important negative predictor of postintervention contraceptive use among males but not among females.

Conclusions

The fourfold analysis framework that we have used here (looking separately at adolescents who had or had not had intercourse at baseline and at males and fe-

males) revealed different effects of the experimental and comparison programs on key measures related to the avoidance of pregnancy. First, as we had hypothesized, adolescent males in the experimental program who at baseline had never had intercourse were less likely than teenagers in the comparison programs to have initiated coitus by the time of the one-year follow-up; however, unexpectedly, there was no such difference among females.

Second, contrary to our hypothesis, females who attended the comparison programs were significantly more likely than those who attended the experimental program to initiate and maintain effective contraceptive use. However, an examination of the contraceptive methods reported by comparison females at their most recent intercourse shows that they relied heavily on condoms. Thus, it is not clear to what extent the contraceptive decision-making of these young women was determined or affected by their exposure to the comparison programs or by their partners' influence and choices. Among the males, the experimental and comparison programs were equally effective in prompting initiation of contraceptive use and in promoting contraceptive efficiency.

Third, among males and females whose first intercourse had occurred before baseline, neither program significantly increased the incidence of effective contraceptive use at most recent intercourse at the one-year follow-up. As expected, the experimental program did lead to a significantly greater improvement over time in contraceptive efficiency among sexually experienced males, but the experimental and comparison programs were equally effective among females who had been coitally active at baseline.

Beyond these, our study revealed several other potentially important findings. Perhaps the most important is that among adolescents who at baseline had not yet initiated coitus, the level of sexual knowledge at the immediate follow-up affected the young women's contraceptive efficiency and the young men's continued abstinence at the one-year follow-up, even when baseline sexual knowledge was controlled. We believe that this is the first time that greater sexual knowledge has been documented to lead to improved contraceptive use or continued abstinence at a later time. This lends empirical support to one of the core tenets of traditional health and sexuality education—that increasing teenagers' base of sexual knowledge will improve their sexual decision-making.

The emergence of prior experience with

sex education as a significant predictor of contraceptive efficiency at the one-year follow-up in three of the four groups analyzed is both pleasing and intriguing. This finding suggests that one major effect of the current demonstration project, independent of the specific treatment program, was to provide many participants additional exposure to sexuality-related material. Formal sexuality education may be a more incremental learning process than we realize, with programs that may have appeared ineffective upon completion or at the time of a short-term follow-up exerting a substantial effect later on, probably in combination with other interventions.

Additionally, the fact that being older at first intercourse was a significant predictor of contraceptive efficiency among females who at baseline had never had intercourse confirms results from previous studies that age at first intercourse is an important factor in both the immediacy and the quality of contraceptive adoption.²⁹

Viewed as a whole, what has been learned from the implementation and findings of this theory-driven demonstration project? First, with adequate funding and an appropriate level of agency and school district cooperation, it is possible to carry out a fairly rigorous impact evaluation of community-based and school-based intervention programs. Second, publicly funded programs of sexuality and contraceptive education as brief as 8-12 hours appear to help all participants increase their sexual and contraceptive knowledge, initiate and maintain relatively high levels of effective contraceptive use (compared with available national sample data for males) and facilitate modest improvements in the consistent use of effective methods for both sexes. Third, clear and persistent differences in program impact related to previous sexual experience, gender, race and ethnicity and prior experience with sexuality education confirm that intervention programs need to be client-specific: One program model does not work equally well for everyone.

In the demonstration project described in this article, the experimental intervention appears to have worked best with males who at baseline had already had intercourse, and generally worked better with non-Hispanic males than with all others. For some educational outreach programs, this sort of client-specific finding may be a starting point for targeting specific groups of clients and particular risk behaviors. That the experimental intervention especially helped young men who were sexually experienced at baseline

Table 6. Beta and T-values predicting contraceptive efficiency at follow-up among adolescent males who had had intercourse prior to intervention, by variable, according to stepwise regression (N=115)

Predictor	Step 1			Step 2			Step 3		
	Beta	T-value	R ²	Beta	T-value	Change in R ²	Beta	T-value	Change in R ²
Contraceptive efficiency at baseline	.302	3.37	.083***	.251	2.90**		.234	2.71**	
Sexual knowledge at baseline				.165	1.92	.095***	.183	2.15*	.031**
Hispanic†				-.263	-2.89		-.276	-3.07***	
Family composition‡				.162	1.80		.161	1.81*	
Intervention§							.177	2.06	
Adjusted R ²									.181

*p<.10. **p<.05. ***p<.01.

†Yes=1, no=0, relative to all others.

‡Lived with both parents=2, lived with one parent=1, lived with neither parent=0.

§Experimental program=1, comparison programs=-1.

to improve the consistency with which they use effective methods (including condoms) should have important implications for framing and developing more effective AIDS education efforts.

One hypothesis for why the experimental program seems to have met with relatively greater success among males is that the program's active involvement, role-playing and interpersonal interaction forced them to examine and to think about their dating and sexual interactions with females in new and unsettling ways. This experience may have given them a new awareness of the risks their sexual partners face, as well as some means with which to maintain or improve their ability to avoid having a pregnancy.

The comparison programs seemed to have been more effective than the experimental program with females who at baseline had never had intercourse, regardless of their race or ethnicity. Females—even the youngest in our sample—may have been so saturated with the threat of pregnancy (the perceived susceptibility to and seriousness of which was a particular focus in the health belief model) that the experimental approach ended up focusing too intensively on topics about which the young women had already heard too much. Consequently, they may have perceived that they had less to learn from the experimental intervention. Moreover, those attending the comparison programs who at baseline had never had intercourse may have responded better to less structured, less interactive or less confrontational programs.

Future research and evaluations combining the health belief model and social learning theory may well be able to strengthen the empirical relationships

identified here by refining the curriculum components, increasing the duration and salience of the interventions to the targeted groups, adopting standard impact-evaluation measures³⁰ and improving the measurement of health beliefs.

Finally, despite the limited impact of the health belief model's perceptual measures in mediating our study results, we believe that a combined measurement and intervention approach utilizing the health belief model and social learning theory may nevertheless prove worthwhile as a guide to designing and targeting interventions or intervention components. In this context, the health belief model measures may hold promise as a screening device to assign participants to program components that directly address their needs.³¹ For instance, teenagers who score low on perceived "susceptibility" (or high on expectancy to become coitally active in the near future) could be directed to programs or program components specifically designed to strengthen the teenagers' perceived susceptibility to pregnancy and STDs. In light of the findings of this and previous research,³² we believe that this sort of approach is the next logical step in developing effective publicly funded educational outreach programs for teenagers.

Appendix

• *Site 1*—family planning clinic of community action program in rural south central Texas. *Population served*: low-socioeconomic-status 13-19-year-olds in a summer work-study program sponsored by private industry. *Samples*: Sample 1 (July 1986-July 1987) consisted of 288 participants (79 percent Hispanic, 12 percent black, nine percent white); retention rate was 60 percent. Sample 2 (July 1987-July 1988) consisted

of 200 participants (84 percent Hispanic, 10 percent black, six percent white); retention rate was 68 percent. *Experimental program*: five two-hour sessions over a two-week period—four hours on sex, biology, STDs and contraceptive methods and six hours of small-group discussion. *Comparison program*: four two-hour sessions over a two-week period—two hours on sex, biology, STDs and contraceptive methods and six hours of small-group discussion on sexual decision-making. *Other*: program assignment random, by classroom; program taught by clinic nursing and health education staff.

• *Site 2*—single high school of small, independent urban school district in San Francisco Bay area. *Sample*: all 100 ninth graders in school, mostly low- to middle-socioeconomic-status 13–18-year-olds (49 percent white, 14 percent Hispanic, 12 percent black and 25 percent of other race or ethnicity); retention rate of 76 percent. *Experimental program*: 15 50-minute sessions during three-week period—four hours on sex, biology, STDs and contraceptive methods and eight hours of small-group discussion. *Comparison program*: 15 50-minute sessions during three-week period implementing district's usual ninth-grade adolescent family life unit—covering sex, biology, STDs and contraceptive methods and including group discussion and class projects. *Other*: assignment random, by classroom; program taught by school social studies teacher and by counselors.

• *Site 3*—single middle school of same district as Site 2. *Sample*: all 101 eighth graders in school, mostly low- to middle-socioeconomic-status 13–15-year-olds (57 percent white, 14 percent Hispanic, seven percent black and 22 percent of other race or ethnicity); retention rate of 77 percent. *Experimental program*: same as site 2. *Comparison program*: 15 50-minute sessions during three-week period implementing district's newly instituted eighth-grade unit on drug education and responsible decision-making—including four hours on sex, biology, STDs and contraceptive methods (with curriculum methods utilizing the health belief model), and group discussion and class projects. *Other*: random assignment by classroom; program taught by school biology teacher and by counselor from district-funded private counseling center.

• *Site 4*—family planning clinic of community action program in rural southwestern Texas. *Population served*: low-socioeconomic-status 13–18-year-old students who participated in Upward-Bound and summer work-study programs. *Sample*: 199 participants studied April 1987–August

1988 (88 percent Hispanic, 12 percent white); retention rate of 62 percent. *Experimental program*: six two-hour sessions over three-week period—four hours on sex, biology, STDs and contraceptive methods and eight hours of small-group discussion. *Comparison program*: two two-hour sessions over three-week period—one hour on sex, biology, STDs and contraceptive methods and three hours of discussion on responsible sexual decision-making. *Other*: assigned randomly, to groups as these were formed in each program cycle; program taught by clinic health education staff.

• *Site 5*—Planned Parenthood affiliate in north-central California. *Population served*: low-socioeconomic-status 14–19-year-old students in a summer work-study program sponsored by private industry. *Sample*: 242 participants studied July 1987–August 1988 (31 percent black, 27 percent Hispanic, 14 percent white and 28 percent of other race or ethnicity); retention rate of 57 percent. *Experimental program*: four two-hour sessions over one-week period—two hours on sex, biology, STDs and contraceptive methods and six hours of small-group discussion. *Comparison program*: three two-hour sessions over one-week period—1–2 hours on sex, biology, STDs and contraceptive methods and 5–6 hours of discussion on sexual responsibility and decision-making with a "peer-educator." *Other*: assigned randomly, by classroom; program taught by staff from community education department.

• *Site 6*—community health education unit of county health department in urban central Texas. *Population served*: low-socioeconomic-status 13–18-year-olds in a private summer work-study program. *Sample*: 222 participants studied July 1987 to August 1988 (55 percent black, 37 percent Hispanic, seven percent white and one percent of other race or ethnicity); retention rate of 57 percent. *Experimental program*: five two-hour sessions over two-week period—four hours on sex, biology, STDs and contraceptive methods and six hours of small-group discussion. *Comparison program*: five two-hour sessions over two-week period—2–3 hours on sex, biology, STDs and contraceptive methods and 7–8 hours of group discussion and exercises on responsible sexual decision-making, using components from a national family life education curriculum. *Other*: assigned randomly, to groups as these were formed in each program cycle; program taught by unit health education staff.

• *Site 7*—free-standing community health center in San Francisco's East Bay area. *Population served*: 14–18-year-old low-so-

cioeconomic-status students from magnet high school who were taking summer remedial biology classes. *Sample*: 92 participants studied July 1987–August 1988 (77 percent black, 17 percent Hispanic, two percent white and three percent of other race or ethnicity); retention rate of 42 percent. *Experimental program*: five two-hour sessions during two-week period of classes—four hours on sex, biology, STDs and contraceptive methods and six hours of small-group discussion. *Comparison program*: five two-hour sessions during two-week period of classes—two hours on sex, biology, STDs and contraceptive methods and eight hours of group discussion and exercises on responsible sexuality and decision-making. *Other*: assigned randomly, by classroom; program taught by staff of community health education department, under agreement with school district.

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Documents

Health Objectives for the Year 2000

In September 1990, the U.S. Department of Health and Human Services (DHHS) released a 672-page report detailing the nation's health objectives for the year 2000.¹ The report continues a health initiative started 10 years ago when the Surgeon General devised a list of health objectives he hoped the nation would meet by 1990.²

Of the 226 measurable objectives set in 1980, about half have been fully achieved. Some were definitely not achieved, and others lack the necessary data to track their progress.³ Of the 15 priority areas that were the focus of the 1990 objectives, progress lagged behind the objectives in the areas of pregnancy and infant health, family planning and sexually transmitted diseases (STDs), among others.

James O. Mason, assistant secretary for health, DHHS, noted that the objectives for the year 2000 represent an attempt to emphasize the preventive aspects of health: "We can no longer afford not to invest in prevention. From the perspective of avoiding human suffering as well as saving wasteful costs for treating diseases and injuries that could have been prevented, the 1990s should be the decade of prevention in the United States."⁴

Although the federal government had an active role in formulating the objectives, a consortium of almost 300 national organizations, as well as all of the state health departments, shaped them. Over a three-year period, these groups provided the data, comment and review that went into devising the objectives and the accompanying report. The intended effect of the objectives on the lives of Americans is threefold: to increase the span of healthy life,

reduce health disparities and achieve access for all to preventive services.

The objectives for the year 2000 have expanded to 22 areas, four of which are thought to be of particular interest to readers of *Family Planning Perspectives* and are reproduced in full here: family planning, maternal and infant health, human immunodeficiency virus (HIV) infection and STDs. Most of the objectives have target outcomes for the general population, and some also have targets for subgroups that are at especially high risk, generally people with low incomes, those from minority groups and those with disabilities.

Family Planning Objectives

1. Reduce pregnancies among girls aged 17 and younger to no more than 50 per 1,000 adolescents. (Baseline: 71.1 pregnancies per 1,000 girls aged 15-17 in 1985.)^{*}

a. Black adolescent girls aged 15-19: 1985 baseline, 186 pregnancies per 1,000; year 2000 target, 120.

b. Hispanic adolescent girls aged 15-19: 1985 baseline, 158 pregnancies per 1,000; year 2000 target, 105.

2. Reduce to no more than 30 percent the proportion of all pregnancies that are unintended. (Baseline: Fifty-six percent of pregnancies in the previous five years were unintended, either unwanted or earlier than desired, in 1988.)

a. Black women: 1988 baseline, 78 percent; year 2000 target, 40 percent.

3. Reduce the prevalence of infertility to no more than 6.5 percent. (Baseline: 7.9 percent of married couples with wives aged 15-44 in 1988.)

a. Black couples: 1988 baseline, 12.1 percent; year 2000 target, 9.0 percent.

b. Hispanic couples: 1988 baseline, 12.4 percent; year 2000 target, 9.0 percent.

4. Reduce the proportion of adolescents who have engaged in sexual intercourse to no more than 15 percent by age 15 and no more than 40 percent by age 17.

(Baseline: 27 percent of girls and 33 percent of boys by age 15; 50 percent of girls and 66 percent of boys by age 17; reported in 1988.)

5. Increase to at least 40 percent the proportion of ever sexually active adolescents aged 17 and younger who have abstained from sexual activity for the previous three months. (Baseline: 24 percent of sexually active girls aged 15-19 in 1988.)

6. Increase to at least 90 percent the proportion of sexually active, unmarried people aged 19 and younger who use contraceptives, especially combined methods that both effectively prevent pregnancy and provide barrier protection against disease. (Baseline: 78 percent at most recent intercourse and 63 percent at first intercourse; two percent used oral contraceptives and the condom at most recent intercourse; among young women aged 15-19 reporting in 1988.)

7. Increase the effectiveness with which family planning methods are used, as measured by a decrease to no more than five percent in the proportion of couples experiencing pregnancy despite use of a contraceptive method. (Baseline: Approximately 10 percent of women using reversible contraceptive methods experienced an unintended pregnancy in 1982.)

8. Increase to at least 85 percent the proportion of people aged 10-18 who have discussed human sexuality, including values surrounding sexuality, with their parents and/or have received information through another parentally endorsed source, such as youth, school or religious programs. (Baseline: Sixty-six percent of people aged 13-18 have discussed sexuality with their parents; reported in 1986.)

9. Increase to at least 90 percent the proportion of pregnancy counselors who offer positive, accurate information about adoption to their unmarried patients with unintended pregnancies. (Baseline: 60 percent of pregnancy counselors in 1984.)

^{*}Baseline data are unavailable for black and Hispanic women aged 15-17; the targets for these two populations are based on data for women aged 15-19. If more complete data become available, a 35 percent reduction from baseline figures should be used as the target.

10. Increase to at least 60 percent the proportion of primary care providers who provide age-appropriate preconception care and counseling. (Baseline data [will be] available in 1992.)

11. Increase to at least 50 percent the proportion of family planning clinics, maternal and child health clinics, sexually transmitted disease clinics, tuberculosis clinics, drug treatment centers and primary care clinics that screen, diagnose, treat, counsel and provide (or refer for) partner notification services for HIV infection and bacterial sexually transmitted diseases (gonorrhea, syphilis and *Chlamydia*). (Baseline: Forty percent of family planning clinics [did so] for bacterial sexually transmitted diseases in 1989.)

Maternal & Infant Health Objectives

1. Reduce the infant mortality rate to no more than seven per 1,000 live births. (Baseline: 10.1 per 1,000 live births in 1987.)

a. Blacks: 1987 baseline, 17.9 deaths per 1,000 live births; year 2000 target, 11.

b. American Indians/Alaska Natives: 1984 baseline, 12.5 deaths per 1,000 live births; year 2000 target, 8.5.

c. Puerto Ricans: 1984 baseline, 12.9 deaths per 1,000 live births; year 2000 target, 8.0.

d. Neonatal mortality: 1987 baseline, 6.5 deaths per 1,000 live births; year 2000 target, 4.5.

e. Neonatal mortality among blacks: 11.7 deaths per 1,000 live births; year 2000 target, 7.0.

f. Neonatal mortality among Puerto Ricans: 1984 baseline, 8.6 deaths per 1,000 live births; year 2000 target, 5.2.

g. Postneonatal mortality: 1987 baseline, 3.6 deaths per 1,000 live births; year 2000 target, 2.5.

h. Postneonatal mortality among blacks: 6.1 deaths per 1,000 live births; year 2000 target, 4.0.

i. Postneonatal mortality among American Indians/Alaska Natives: 1984 baseline, 6.5 deaths per 1,000 live births; year 2000 target, 4.0.

j. Postneonatal mortality among Puerto Ricans: 1984 baseline, 4.3 deaths per 1,000 live births; year 2000 target, 2.8.

2. Reduce the fetal death rate (20 or more weeks of gestation) to no more than five per 1,000 live births plus fetal deaths. (Baseline: 7.6 per 1,000 live births plus fetal deaths in 1987.)

a. Blacks: 1987 baseline, 12.8 fetal deaths per 1,000 live births plus fetal deaths; year 2000 target, 7.5.

3. Reduce the maternal mortality rate to no more than 3.3 per 100,000 live

births. (Baseline: 6.6 per 100,000 in 1987.)

a. Blacks: 1987 baseline, 14.2 deaths per 100,000 live births; year 2000 target, 5.0.

4. Reduce the incidence of fetal alcohol syndrome to no more than 0.12 per 1,000 live births. (Baseline: 0.22 per 1,000 live births in 1987.)

a. American Indians/Alaska Natives: 1987 baseline, four cases per 1,000 live births; year 2000 target, 2.0.

b. Blacks: 1987 baseline, 0.8 cases per 1,000 live births; year 2000 target, 0.4.

5. Reduce low birth weight to an incidence of no more than five percent of live births and very low birth weight to no more than one percent of live births. (Baseline: 6.9 and 1.2 percent, respectively, in 1987.)

a. Blacks, low birth weight: 1987 baseline, 12.7 percent of live births; year 2000 target, 9.0 percent.

b. Blacks, very low birth weight: 1987 baseline, 2.7 percent of live births; year 2000 target, 2.0 percent.

6. Increase to at least 85 percent the proportion of mothers who achieve the minimum recommended weight gain during their pregnancies. (Baseline: 67 percent of married women in 1980.)

7. Reduce severe complications of pregnancy to no more than 15 per 100 deliveries. (Baseline: 22 hospitalizations [prior to delivery] per 100 deliveries in 1987.)

8. Reduce the cesarean delivery rate to no more than 15 per 100 deliveries. (Baseline: 24.4 per 100 deliveries in 1987.)

a. Primary (first time) cesarean delivery: 1987 baseline, 17.4 cesareans per 100 deliveries; year 2000 target, 12 per 100 deliveries.

b. Repeat cesarean deliveries: 1987 baseline, 91.2 cesareans per 100 deliveries among women who had a previous cesarean delivery; year 2000 target, 65.

9. Increase to at least 75 percent the proportion of mothers who breastfeed their babies in the early postpartum period and to at least 50 percent the proportion who continue breastfeeding until their babies are 5-6 months old. (Baseline: 54 percent at discharge from birth site and 21 percent at 5-6 months in 1988.)

a. Low-income mothers: 1988 baseline, 32 percent during early postpartum period and nine percent at age 5-6 months; year 2000 target, 75 percent during early postpartum period and 50 percent at age 5-6 months.

b. Black mothers: 1988 baseline, 25 percent during early postpartum period and eight percent at age 5-6 months; year 2000 target, 75 percent during early postpartum period and 50 percent at age 5-6 months.

c. Hispanic mothers: 1988 baseline, 51 percent during early postpartum period and 16 percent at age 5-6 months; year 2000 target, 75 percent during early postpartum period and 50 percent at age 5-6 months.

d. American Indian/Alaska Native mothers: 1988 baseline, 47 percent during early postpartum period and 28 percent at age 5-6 months; year 2000 target, 75 percent during early postpartum period and 50 percent at age 5-6 months.

10. Increase abstinence from tobacco use by pregnant women to at least 90 percent and increase abstinence from alcohol, cocaine and marijuana by pregnant women by at least 20 percent. (Baseline: Seventy-five percent of pregnant women abstained from tobacco use in 1985; data for alcohol, cocaine and marijuana use by pregnant women will be available from the National Natality Survey in December 1990.)

11. Increase to at least 90 percent the proportion of all pregnant women who receive prenatal care in the first trimester of pregnancy. (Baseline: 76 percent of live births in 1987.)

a. Black women: 1987 baseline, 61.1 percent of live births; year 2000 target, 90 percent of live births.

b. American Indian/Alaska Native women: 1987 baseline, 60.2 percent of live births; year 2000 target, 90 percent of live births.

c. Hispanic women: 1987 baseline, 61.0 percent of live births; year 2000 target, 90 percent of live births.

12. (See number 10 under Family Planning.)

13. Increase to at least 90 percent the proportion of women enrolled in prenatal care who are offered screening and counseling on prenatal detection of fetal abnormalities. (Baseline data [will be] available in 1991; this objective will be measured by tracking use of maternal serum alpha-fetoprotein screening tests.)

14. Increase to at least 90 percent the proportion of pregnant women and infants who receive risk-appropriate care. (Baseline data available in 1990; this objective will be measured by tracking the proportion of very low birth weight infants [less than 1,500 grams] born in facilities covered by a neonatologist 24 hours a day.)

15. Increase to at least 95 percent the proportion of newborns screened by state-sponsored programs for genetic disorders and other disabling conditions and to 90 percent the proportion of newborns testing positive for disease who receive appropriate treatment. (Baseline: for sickle

cell anemia, with 20 states reporting, approximately 33 percent of live births screened [57 percent of black infants]; for galactosemia, with 38 states reporting, approximately 70 percent of live births screened.)

16. Increase to at least 90 percent the proportion of babies aged 18 months and younger who receive recommended primary care services at the appropriate intervals. (Baseline data [will be] available in 1992.)

STD Objectives

1. Reduce gonorrhea to an incidence of no more than 225 cases per 100,000 people. (Baseline: 300 per 100,000 in 1989.)

a. Blacks: 1989 baseline, 1,990 cases per 100,000; year 2000 target, 1,300.

b. Adolescents aged 15-19: 1989 baseline, 1,123 cases per 100,000; year 2000 target, 750.

c. Women aged 15-44: 1989 baseline, 501 cases per 100,000; year 2000 target, 290.

2. Reduce *Chlamydia trachomatis* infections, as measured by a decrease in the incidence of nongonococcal urethritis, to no more than 170 cases per 100,000 people. (Baseline: 215 per 100,000 in 1988.)

3. Reduce primary and secondary syphilis to an incidence of no more than 10 cases per 100,000 people. (Baseline: 18.1 per 100,000 in 1989.)

a. Blacks: 1989 baseline, 118 cases per 100,000 people; year 2000 target, 65.

4. Reduce congenital syphilis to an incidence of no more than 50 cases per 100,000 live births. (Baseline: 100 per 100,000 live births in 1989.)

5. Reduce genital herpes and genital warts, as measured by a reduction to 142,000 and 385,000, respectively, in the annual number of first-time consultations with a physician for the conditions. (Baseline: 167,000 and 451,000 in 1988.)

6. Reduce the incidence of pelvic inflammatory disease, as measured by a reduction in hospitalizations for pelvic inflammatory disease, to no more than 250 per 100,000 women aged 15-44. (Baseline: 311 per 100,000 in 1988.)

*Provider referral (previously called contact tracing) is the process whereby health department personnel directly notify the sexual partners of infected individuals of their exposure to an infected individual.

†Targets for this objective are equal to upper-bound estimates of the incidence of diagnosed AIDS cases projected for 1993.

‡Aged 15-24 in the New York City vicinity; in areas other than major metropolitan centers, infection rates in people entering selected drug treatment programs tested in unlinked surveys are often under 500 per 100,000.

7. Reduce sexually transmitted hepatitis B infection to no more than 30,500 cases. (Baseline: 58,300 cases in 1988.)

8. Reduce the rate of repeat gonorrhea infection to no more than 15 percent [of patients who] within the previous year [were treated for a separate case of gonorrhea]. (Baseline: 20 percent in 1988.)

9. (See number four under Family Planning.)

10. Increase to at least 50 percent the proportion of sexually active, unmarried people who used a condom at last sexual intercourse. (Baseline: Nineteen percent of sexually active, unmarried women aged 15-44 reported [in 1988] that their partners used a condom at last sexual intercourse.)

a. Sexually active young women (by their partners) aged 15-19: 1988 baseline, 25 percent; year 2000 target, 60 percent.

b. Sexually active young men aged 15-19: 1988 baseline, 57 percent; year 2000 target, 75 percent.

c. Intravenous drug abusers: 1988 baseline, not available; year 2000 target, 60 percent.

11. (See number 11 under Family Planning.)

12. Include instruction in sexually transmitted disease transmission prevention in the curricula of all middle and secondary schools, preferably as part of quality school health education. (Baseline: Ninety-five percent of schools reported offering at least one class on sexually transmitted diseases as part of their standard curricula in 1988.)

13. Increase to at least 90 percent the proportion of primary care providers treating patients with sexually transmitted diseases who correctly manage cases, as measured by their use of appropriate types and amounts of therapy. (Baseline: 70 percent in 1988.)

14. Increase to at least 75 percent the proportion of primary care and mental health care providers who provide age-appropriate counseling on the prevention of HIV and other sexually transmitted diseases. (Baseline: Ten percent of physicians reported that they regularly assessed the sexual behaviors of their patients in 1987.)

a. Primary care and mental health care providers who practice in areas of high AIDS and sexually transmitted disease incidence: 1987 baseline, not available; year 2000 target, 90 percent.

15. Increase to at least 50 percent the proportion of all patients with bacterial sexually transmitted diseases (gonorrhea, syphilis, and *Chlamydia*) who are offered

provider referral services.* (Baseline: 20 percent of those treated in sexually transmitted disease clinics in 1988.)

HIV Infection Objectives

1. Confine annual incidence of diagnosed AIDS cases to no more than 98,000 cases. (Baseline: an estimated 44,000 to 50,000 diagnosed cases in 1989.)†

a. Gay and bisexual men: 1989 baseline, 26,000-28,000 cases; year 2000 target, 48,000.

b. Blacks: 1989 baseline, 14,000-15,000 cases; year 2000 target, 37,000.

c. Hispanics: 1989 baseline, 7,000-8,000 cases; year 2000 target, 18,000.

2. Confine the prevalence of HIV infection to no more than 800 [infections] per 100,000 [people]. (Baseline: an estimated 400 per 100,000 in 1989.)

a. Homosexual men: 1989 baseline, 2,000-42,000 infections per 100,000 homosexual men aged 15-24; year 2000 target, 20,000.

b. Intravenous drug abusers: 1989 baseline, 30,000-40,000 infections per 100,000; year 2000 target, 40,000.

c. Women giving birth to live-born infants: 1989 baseline, 150 infections per 100,000; year 2000 target, 100.

3. (See number four under Family Planning.)

4. (See number 10 under Sexually Transmitted Diseases.)

5. Increase to at least 50 percent the estimated proportion of all intravenous drug abusers who are in drug abuse treatment programs. (Baseline: An estimated 11 percent of opiate abusers were in treatment in 1989.)

6. Increase to at least 50 percent the estimated proportion of intravenous drug abusers not in treatment who use only uncontaminated drug paraphernalia. (Baseline: 25-35 percent of opiate abusers in 1989.)

7. Reduce to no more than one per 250,000 units of blood and blood components the risk of transfusion-transmitted HIV infection. (Baseline: one per 40,000-150,000 units in 1989.)

8. Increase to at least 80 percent the proportion of HIV-infected people who have been tested for HIV infection. (Baseline: An estimated 15 percent of approximately 1,000,000 HIV-infected people had been tested at publicly funded clinics in 1989.)

9. (See number 14 under Sexually Transmitted Diseases.)

10. Increase to at least 95 percent the proportion of schools that have age-appropriate HIV education curricula for students in 4th-12th grade, preferably as part of

quality school health education. (Baseline: Sixty-six percent of school districts required HIV education and five percent of school districts required HIV education in each year for 7th-12th grade in 1989.)

11. Provide HIV education for students and staff in at least 90 percent of colleges and universities. (Baseline data available in 1995.)

12. Increase to at least 90 percent the proportion of cities with populations over

100,000 that have outreach programs to contact drug abusers (particularly intravenous drug abusers) to deliver HIV risk-reduction messages. (Baseline data available in 1995.)

13. (See number 11 under Family Planning.)

14. Extend regulations to protect workers from exposure to blood-borne infections to all facilities where workers are at risk for occupational transmission of HIV. (Baseline data to be available in 1992.)

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3. Public Health Service, 1990, op. cit. (see reference 1), p. 4.

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(Continued from page 251)

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AIDS-Related Mortality Increased Almost Fourfold From 1985 to 1988 Among U.S. Women Aged 15-44

Mortality related to the human immunodeficiency virus (HIV) and AIDS nearly quadrupled among American women of reproductive age between 1985 and 1988. According to an analysis of recent national mortality data,¹ substantial racial and regional differences characterize HIV-related mortality among women aged 15-44: In 1988, the rate among black women was nearly nine times that among white women; in 1987, rates in the Northeast were 26 times those in the Midwest. Since the majority of HIV-infected children are infected at birth by their mothers, these mortality trends among women of child-bearing age indicate that infection rates among children will also rise, bringing about an associated increase in public costs related to the AIDS epidemic.

Researchers from the Centers for Disease Control (CDC) used final mortality data for the years 1980 through 1987 and provisional data for 1988 from the National Center for Health Statistics to calculate annual death rates from AIDS. Rates were adjusted for age based on the 1980 female U.S. population. For the period 1980-1986, the investigators classified a death as caused by HIV or AIDS if the underlying cause was one of three AIDS-related diagnoses in the International Classification of Disease code. In 1987, new codes were added for HIV/AIDS deaths. Thus, the data sets for 1980-1986 and 1987-1988 are not strictly comparable. State and regional AIDS mortality rates were calculated based on 1987 data. Changes in mortality patterns and the most common causes of death were also examined.

Overall, the mortality rate attributed to AIDS nearly quadrupled between 1985 and 1988, going from 0.6 deaths to 2.2 deaths per 100,000 women aged 15-44. AIDS mortality among women varied widely by region: The age-adjusted rate in the Northeast was more than 26 times greater than that in the Midwest (5.3 per 100,000 vs. 0.2

per 100,000). The two states with the highest rates among women aged 15-44 were New Jersey and New York (9.4 and 9.3 per 100,000, respectively). The next highest HIV-related mortality rates were in the District of Columbia (4.3 per 100,000), Florida (4.2 per 100,000) and Connecticut (2.2 per 100,000). However, seven states (Idaho, Montana, Nevada, North Dakota, Oklahoma, South Dakota and Vermont) reported no AIDS-related deaths among women in this age-group.

While rates of AIDS-related deaths have been steadily increasing among both black and white women, AIDS-related mortality is far higher among black women. In 1988, the age-adjusted rate among women of reproductive age was almost nine times greater among black women (10.3 per 100,000) than among white women (1.2 per 100,000). The 1987 rates for black women aged 15-44 in New Jersey and New York were 41 and 30 per 100,000, respectively, compared with four per 100,000 and eight per 100,000 among white women in those states. In fact, in New Jersey and New York, AIDS became the leading cause of death among black women of reproductive age in 1987, surpassing malignant neoplasms and heart disease. Among women of both races, the majority of AIDS-related deaths occurred among 25-34-year-olds. AIDS accounted for 11 percent of all deaths among black women in the United States aged 25-34 and three percent of those among white women aged 25-34.

Conditions that were most likely AIDS-related increased more rapidly in those states having the highest incidence of AIDS. From the 1987 multiple-cause mortality data, the investigators identified a total of 1,301 deaths that were probably HIV-related—1,016 for which AIDS was identified as the underlying cause on the death certificate (the formal surveillance definition), 141 for which HIV infection or AIDS was mentioned on the certificate and

a further 144 for which there was no mention of HIV or AIDS but a listing of Kaposi's sarcoma, *Pneumocystis carinii* or laboratory evidence of HIV infection. The most common cause of death not included in the CDC surveillance definition was drug abuse, which appeared on 27 percent of the death certificates that mentioned HIV or AIDS. The investigators point out that mortality caused by pregnancy complications, cervical cancer or pelvic inflammatory disease was seldom listed on these certificates.

The 1987 AIDS-related mortality rates among black women in New Jersey and New York, the researchers comment, are comparable to those reported for adult women in the high-prevalence West African city of Abidjan, Ivory Coast (31 per 100,000). They predict that on the basis of current trends in mortality among women aged 15-44, "AIDS can be expected to become one of the five leading causes of death by 1991." Moreover, they warn that their estimates of current rates are conservative, since they are based solely on deaths in which AIDS was clearly identified as the underlying cause; including all of the probable associated causes would increase the total number of cases by 28 percent. According to the researchers, the increase in high-prevalence areas in mortality that falls outside the formal surveillance definition reflects the various infectious and immune complications caused by AIDS, probable unrecognized cases, variation in reporting of HIV-related conditions and the reluctance of physicians to specify HIV or AIDS as the cause of death.

In 1987, AIDS became the eighth leading cause of death among American women of reproductive age; by comparison, the other leading causes of mortality in this age-group remained relatively unchanged over the period. The researchers assert that HIV mortality differs from other mortality among women of reproductive age in one

crucial aspect: Rates of HIV mortality among women directly affect rates of infection among children. The researchers conclude that the number of new cases among women of childbearing age will continue to rise. Furthermore, since the care of both AIDS-infected women and their children depends greatly on public resources, "as the number of pediatric cases increases, the medical and social costs will become staggering."—L. Remez

Reference

1. S. Y. Chu, J. W. Buehler and R. L. Berkelman, "Impact of the Human Immunodeficiency Virus Epidemic on Mortality in Women of Reproductive Age, United States," *Journal of the American Medical Association*, 264:226, 1990.

Knowledge of HIV Risks Does Not Always Prompt Safer Sexual Behavior

Canadian college students appear to be well-informed about the transmission and prevention of AIDS and other sexually transmitted diseases (STDs), but many continue to have sex with more than one partner, engage in anal intercourse or fail to use condoms consistently, according to a recent study.¹ Although nearly all of the students knew that having many sexual partners greatly increases the risk of acquiring AIDS, one in five men and one in 12 women had had 10 or more partners, and only small proportions of these consistently used condoms. Condom use was not significantly influenced by knowledge about STDs, fear of acquiring an STD or having had an STD in the past.

In the first six months of 1988, first-year students at 51 Canadian colleges and universities were asked to complete an anonymous questionnaire on knowledge and attitudes about STDs and on current sexual practices and behavior. The questionnaire also solicited data on the students' demographic and life-style characteristics and included scales to assess their mental health and self-esteem and the quality of their relationships with parents and peers. About 97 percent of those approached agreed to participate.

Of 6,911 students who filled out the questionnaire, 1,397 were excluded from the analysis because they were older than 24 or were not enrolled in a first-year (in Quebec, second-year) class; the final sample included 2,248 men and 3,266 women. The mean age of the respondents was 19.8 years for men and 19.6 years for women. Among the men, 59 percent lived with immediate family or other relatives,

31 percent lived with a roommate and 10 percent lived alone. Among the women, these proportions were 55 percent, 34 percent and 10 percent, respectively. Eleven percent of both the men and the women smoked more than 10 cigarettes a day, and 23 percent of the men and nine percent of the women consumed more than three drinks a week. Six percent of the men and two percent of the women used marijuana more than once a week and less than 0.5 percent used cocaine weekly; less than 1.5 percent of men and less than 0.6 percent of women had ever used intravenous drugs.

The students were better informed about the human immunodeficiency virus (HIV) than about other STDs: Men and women correctly answered 71 percent and 70 percent, respectively, of questions about HIV and 62 percent and 65 percent, respectively, of questions about other STDs. Many of the students lacked adequate knowledge about the prevention of STDs: Fewer than half were aware that oil-based lubricants such as petroleum jelly should not be used with a condom (they cause deterioration of latex), only 59 percent knew that using spermicide with a condom increases protection and 48 percent were not aware that genital herpes can be acquired through oral sex. Furthermore, 18 percent of the students did not realize that infection with an STD does not confer future immunity, and 13 percent thought that oral contraceptives protect women against STDs. About half (48 percent) did not know that STD infections can be asymptomatic, and the great majority (85 percent) were not aware that men and women are not at equal risk of serious consequences from STDs.

Two percent of the students were omitted from the analyses of sexual behavior because they did not indicate whether or not they had had intercourse; of the 5,419 students included in those analyses, 71 percent were sexually experienced. Of the 1,566 students who had not engaged in sexual intercourse, 57 percent of the men and 52 percent of the women chose the explanation "Have not met the right person yet" from a list of nine options. One percent of the sexually experienced students identified their orientation as homosexual, and an additional one percent considered themselves bisexual. Forty percent of the men and 25 percent of the women had had at least five partners; 21 percent of the men and nine percent of the women had had at least 10. Fourteen percent of the men and 19 percent of the women had had anal intercourse, and the students who had had the most partners were most likely to have

done so: Of those who had had five or more partners, 21 percent of the men and 28 percent of the women had engaged in anal intercourse at least once, and nine percent and four percent, respectively, had done so frequently. Of the men and women who had had at least 10 partners, 27 percent and 35 percent, respectively, had had anal intercourse, and eight percent and three percent had done so frequently.

Few students of either sex reported consistent use of condoms: Sixteen percent of the sexually active women and 25 percent of the sexually active men said they always used them. Among the women, those with the most partners were the least likely to use condoms consistently: Eight percent of those with 10 or more partners said they always used them, compared with 19 percent of those with one or two partners. Among the men, condom use was not related to the number of partners. Very few of the students used spermicide and condoms together, with 83 percent of the men and 89 percent of the women reporting that they never did so.

The proportion of students who had had an STD was relatively low, but rose sharply with the number of partners. Overall, six percent of the sexually active students reported having had an STD at least once. Among those who had had only one partner, less than one percent of the men and three percent of the women had had an STD, compared with 11 percent of the men and 24 percent of the women who had had 10 or more partners.

The investigators used stepwise regression analysis to identify factors associated with an increased number of partners, those associated with participation in anal intercourse, and those related to irregular or no use of condoms. They found that among both men and women, all of the following were associated with a higher number of partners: older age; use of alcohol, marijuana or cigarettes; a more casual attitude toward sex; oral contraceptive use; increased worry about AIDS as a consequence of sexual intercourse; a good relationship with peers; having had an STD; and difficulty in saying no. Men who were less embarrassed about buying condoms, those who had had less discussion with prospective partners about past sexual experiences and those who used condoms less frequently were more likely to have had more partners, as were women who were less likely to plan on lifetime sexual monogamy, felt less pressure from friends to be sexually active, were less likely to have considered suicide, had better communication with sexual partners, were less

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embarrassed to buy condoms and correctly answered a higher proportion of HIV knowledge items.

The likelihood of having had anal intercourse was highest among men and women who had had more partners and who were of lower social and economic status. Men who felt pressure from friends to have sex and who had a lower HIV knowledge score were significantly more likely to have engaged in anal intercourse. Among women, factors related to anal intercourse were younger age, discussion of condom use with a prospective partner, a lower mental health score and agreement that carrying a condom indicates a willingness to have sex.

The factors that were related to irregular or no use of condoms were essentially the same for men and women: embarrassment about buying condoms, difficulty in discussing condom use with a prospective

partner, use of oral contraceptives, the belief that condoms interfere with sexual pleasure, and insufficient knowledge about HIV. A higher number of partners was associated with irregular or no use of condoms for women, but not for men.

The investigators noted that among women, there was a strong relationship among the number of partners, the use of oral contraceptives, the use of condoms and a history of STD infection. The more partners a woman had had, the more likely it was that she used oral contraceptives and had a history of STD infection, and the less likely it was that she used condoms. Less than three percent of the women who had had only one or two partners and consistently used condoms reported a previous STD diagnosis, compared with 25 percent of those who had had five or more partners and reported inconsistent condom use. Among women who had had only one partner, 58 percent used oral contraceptives but did not always use a condom, compared with 79 percent of those who had had 10 or more partners.

The investigators comment that al-

though few of the college students in their sample were members of groups at high risk of AIDS, the sexual behavior in which many of them engaged—multiple partners, anal intercourse and failure to use condoms consistently—could place them at risk as the prevalence of HIV infection in the heterosexual population rises. Because the risk of HIV transmission is considerably higher in the presence of genital ulcer disease (chancroid, syphilis and herpes), the low rate of condom use is cause for concern. The investigators point out that “the strong association between decreasing condom use [and] increasing reliance on oral contraceptives, especially among women with [multiple] partners, is . . . consistent with [results of] previous reported studies.” They conclude that “the promotion of oral contraceptives for birth control in this population without an emphasis on the need for concomitant condom use to minimize the risk of STD/HIV must be examined.”—F. Althaus

Reference

1. N. E. MacDonald et al., “High-Risk STD/HIV Behavior Among College Students,” *Journal of the American Medical Association*, 263:3155, 1990.

Both Paid and Unpaid Work During Pregnancy Have Little Independent Effect on Birth Weight

Working during pregnancy appears to have little impact on the birth weight of a woman's newborn, once potentially confounding factors are controlled for. The timing of employment during pregnancy is also unrelated to birth weight; however, the number of hours the mother slept is positively and significantly related to birth weight. These are some of the findings of a prospective study examining maternal physical activity in paid and unpaid work at several stages of gestation.¹

From August 1982 through March 1984, investigators recruited consecutive patients seeking prenatal care at a district general hospital in inner London. To be eligible for the study, the women had to be white, English-speaking, over 15 years of age, healthy and seeking prenatal care before the 24th week of a singleton pregnancy. The final sample consisted of 1,507 pregnant women from a variety of socioeconomic backgrounds. Data on both paid work and housework were collected during interviews conducted at the women's first visit (at a mean of 14 weeks' gestation) and at 17, 28 and 36 weeks. (Since relatively few women reported participating in nonsedentary recreational activities during pregnancy, the researchers did not

examine the association between active recreation and birth weight.)

The researchers performed multivariate linear regression analyses to determine any associations between birth weight and employment, while controlling for potentially confounding factors (e.g., biological and behavioral characteristics known to affect birth weight). The analysis did not include socioeconomic factors, since these measures had no effect on birth weight once smoking and biological factors were taken into account. The investigators also carried out a separate analysis of the association between attained birth weight and length of pregnancy. Low birth weight was examined as a continuous variable rather than as a discrete event.

The babies of the women studied weighed a mean of 3,327 g. Five percent of the babies were of low birth weight (less than 2,500 g at birth). At the start of their pregnancies, 55 percent of the women were employed (42 percent full-time and 14 percent part-time). Roughly half of the women who were employed during pregnancy left their jobs by 29 weeks' gestation.

The infants born to women who worked full-time during pregnancy weighed an average of 49 g less than those born to

women who had no paid employment. However, once the analysis controlled for maternal height, weight, age, parity, blood pressure and smoking, the infant's sex, and the length of gestation, the babies of mothers who worked full-time actually weighed 12 g more than the infants of nonworking mothers, although the relationship was no longer statistically significant. In addition, after the researchers controlled for these factors, the babies of women who worked past 29 weeks' gestation weighed 12 g more than those born to other women; this difference was also statistically nonsignificant.

The investigators observe that even for the worst case (i.e., at the lowest end of the 95 percent confidence interval) in the potential association between birth weight and paid work, birth weight would decrease by just 39 g, on average, among the babies born to working women. Similarly, the worst case for babies born to women working beyond 29 weeks' gestation would be a decrease of 43 g. In comparison, babies born to women who smoked 1–9 cigarettes per day weighed, on average, about 130 g less than those born to nonsmokers; thus, the association with light smoking was three times greater than

the association with either measure of maternal employment.

Analyses of the effects of the number of hours worked, the energy expended per hour and the woman's posture at her job all failed to show a statistically significant association with birth weight. The investigators also note that household work performed during pregnancy was unrelated to birth weight, and that maternal activity did not affect the duration of the pregnancy either.

However, the number of hours the mother slept was significantly ($p < .05$) associated with birth weight. Women who slept for more than nine hours a night at 17 weeks and 28 weeks of gestation had babies who weighed an average of 74 g and 60 g more at birth, respectively, than those born to women who slept less.

The researchers caution that selection bias cannot be ruled out, since women who are employed are generally considered healthier—and thus more likely to have heavier babies—than those who are not employed. They also note that the analysis relied on many approximations of energy output that could not be objectively verified. Nevertheless, the investigators assert that "it is reassuring that mean birth weight is likely to be unaffected, or at most diminished only slightly, by the range of activities present in the population studied." They conclude that in the absence of known environmental hazards, there is no evidence that "work per se during pregnancy interferes with fetal growth."—*L. Remez*

Reference

1. C. S. Rabkin et al., "Maternal Activity and Birth Weight: A Prospective, Population-Based Study," *American Journal of Epidemiology*, 131:522, 1990.

HIV Infection Rates Vary Widely Among Non-AIDS Hospital Patients in U.S.

Rates of infection with the human immunodeficiency virus (HIV) vary enormously across the United States, ranging from 0.1 percent to 7.8 percent of patients who were tested anonymously for the virus in 26 urban hospitals after being admitted for reasons not associated with HIV infection. According to HIV surveillance conducted by the Centers for Disease Control (CDC) at these designated "sentinel" or monitoring hospitals,¹ the age distribution of infected patients is similar across hospitals and resembles that of actual diagnosed AIDS cases. However, the hospitals where seroprevalence rates are highest have the

lowest ratio of infected male to infected female patients. The findings suggest a need for routine screening among all adult hospital patients in high-prevalence areas, regardless of the patients' reasons for seeking hospital care.

The CDC instituted the Sentinel Hospital Surveillance System to obtain a profile of HIV infection across all age-groups and risk groups. To eliminate self-selection bias, testing was anonymous and blinded. All patients admitted for reasons associated with HIV were excluded so the sample would better reflect the communities served by the hospitals. The investigators also used a stratified sampling procedure to ensure that the age distribution of the sample would resemble that of the general population in the hospitals' catchment area rather than that of the patient population. The 26 major urban hospitals designated to serve as monitors of HIV infection have large and socioeconomically diverse patient populations; nine are city or county hospitals and 17 are private and nonprofit. Forty-two percent of the patients admitted to the sentinel hospitals are either uninsured or on Medicaid. In 1988, the aggregate incidence of AIDS in the United States was 13.3 per 100,000, while that for the metropolitan areas of the sentinel hospitals was 25.0 per 100,000.

From January 1988 through June 1989, a total of 89,547 blood specimens were tested anonymously for the HIV antibody. Serum or plasma specimens were identified only by the patient's age, sex, race or ethnicity and month of testing. Overall, 1,201 patients (1.3 percent) tested positive; at every sentinel hospital, at least one patient admitted for a medical problem unrelated to AIDS had antibodies to HIV. The median rate of seroprevalence at the sentinel hospitals was 0.7 percent, but there was a more than 70-fold range in the proportion testing positive for HIV—from 0.1 percent to 7.8 percent. In general, rates were higher in the Northeast and South than in the Midwest or West. The two hospitals with rates of over five percent were in the New York metropolitan area—the South Bronx in New York City, and Newark, New Jersey.

The age distribution among men and women testing positive for HIV was similar across the sentinel hospitals and resembled that found among actual cases of AIDS. In the sentinel hospitals, 69 percent of patients who tested positive were 25–44-year-old males, while the comparable proportion among AIDS patients in the United States was 66 percent. At the two hospitals with the highest seroprevalence rates,

18–22 percent of all men in this age-group had HIV antibodies.

Sixteen percent of the seropositive patients detected in the study were women, compared with 11 percent of AIDS patients nationwide. Infection rates were consistently higher among males than among females. However, the male-to-female ratio among infected patients was directly related to overall seroprevalence: Those hospitals with the highest overall infection rates had significantly lower ratios of male-to-female HIV infection ($p < .001$). For example, there were approximately seven men to every woman among all infected patients aged 25–44 in the sample, but among infected patients in this age-group at the five hospitals where seroprevalence was over two percent, there were approximately three men to every woman.

The median black-to-white ratio for HIV infection also varied according to the overall rates of seroprevalence; it was nearly two to one at the 18 hospitals with comparable data for black and white patients. However, in three of seven hospitals with overall rates below the median, proportionally more white patients than black patients tested positive for HIV antibodies. In addition, the investigators note that hospitals with higher proportions of AIDS cases related to intravenous drug use tended to have higher black-to-white seroprevalence ratios.

Based on the finding that HIV-infected women are concentrated in high-seroprevalence hospitals, where the male-to-female ratio of infected patients is lowest, the researchers predict that women and their children will account for an increasingly higher proportion of future AIDS cases. According to the investigators, the growth in the proportion of women testing positive is likely to lead to increased heterosexual transmission of HIV in inner-city areas, including increased female-to-male transmission. On the other hand, the higher ratio of male-to-female cases in hospitals with comparatively low seroprevalence rates suggests that homosexual contact will continue to be the predominant mode of transmission in these areas, which are probably more typical of most of the United States.

The investigators observe that the seroprevalence rates at the sentinel hospitals indicate that the overall level of infection in the United States far surpasses the number of diagnosed cases. Thus, the researchers claim that their "findings yield no support for the premise that the AIDS epidemic will soon abate, even in the areas that were the earliest affected, such as the

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New York metropolitan area." Furthermore, since the survey gathered data on patients admitted for reasons presumably unrelated to HIV infection, the researchers claim that the findings strongly support the need for universal precautions among hospital staff.

Since many persons who are at high risk for AIDS have limited access to testing or medical care outside the hospital system, the researchers conclude that HIV testing and counseling "should be routinely offered to all adult hospital patients in areas with a high prevalence of HIV-1 infection, regardless of a patient's clinical presentation." Not to do so, according to the authors, would mean losing the opportunity to treat infected patients early on and perhaps prevent further transmission of the virus. In lower prevalence areas, the researchers recommend a program of targeted testing and counseling to restricted subgroups of patients.—L. Remez

Reference

1. M. E. St. Louis et al., "Seroprevalence Rates of Human Immunodeficiency Virus Infection at Sentinel Hospitals in the United States," *New England Journal of Medicine*, 323:213, 1990.

Chlamydia Implicated In Ectopic Pregnancy, Poor Birth Outcomes

Chlamydial infections appear to increase a woman's risk of having an ectopic pregnancy and, in normal pregnancies, to increase her risk of delivering prematurely. In a retrospective study of more than 500 pregnant women, those who were successfully treated for chlamydia had significantly lower rates of premature rupture of the membranes, premature contractions and small-for-gestational-age infants than did women who remained infected during pregnancy; rates in the treated group were comparable to those found among chlamydia-free controls.¹ In addition, a study that compared women who had ectopic pregnancies with those who had intrauterine pregnancies suggests that a history of chlamydial infection more than doubles the risk of ectopic pregnancy.²

The first study was conducted between 1986 and 1988 at a prenatal clinic serving mostly black, low-income women in Cleveland. At the initial visit, at each 2-3 month

interval during pregnancy and at the first postpartum visit, 5,875 women were screened for chlamydia by cervical swab; 338 found to be positive were given 2.0 g oral erythromycin each day for seven days.

Fifteen of the women who tested positive were unavailable for follow-up and were excluded; of the 323 remaining patients, 244 were successfully treated for chlamydia, as evidenced by repeated negative swabs; 79 either had persistent or recurrent chlamydial infections later in pregnancy (26 patients each) or were initially screened and found to be chlamydia-positive less than one week before delivery (27 patients). One control was chosen for each successfully treated patient, matched by age, race, gravidity, parity, marital status, socioeconomic level and use of cigarettes, alcohol or other drugs. There were no significant differences between these three groups in age, race, marital status, socioeconomic level, gravidity or parity.

The investigators found significantly lower rates of adverse pregnancy outcomes among women who were successfully treated for chlamydia compared with those who remained infected. They were 69 percent less likely to have premature rupture of the membranes, 87 percent less likely to have premature contractions, 84 percent less likely to deliver prematurely and 55 percent less likely to bear a small-for-gestational-age infant. Also, successfully treated patients had a significantly lower rate of premature delivery (three percent) and a higher mean birth weight (3,202 g) than either chlamydia-positive women (14 percent and 3,002 g, respectively) or controls (12 percent and 3,095 g, respectively).

Some previous studies have found similar relationships between chlamydial infection and pregnancy outcomes. However, the investigators comment that theirs may be the first to evaluate the effects of successful treatment of chlamydia during pregnancy. They suggest that the higher rate of premature delivery (and lower birth weights) among controls may indicate the presence of microorganisms other than chlamydia that may be effectively treated with erythromycin; several vaginal and cervical infections have been implicated as a cause of prematurity in other studies.

A second study suggests that the growing prevalence of chlamydial infection may be contributing to the increased rates of ectopic pregnancy in the United States. Investigators screened for the presence of antibodies to chlamydia in blood samples of 306 women with an ectopic pregnancy and of 266 pregnant patients who served as controls. About 69 percent of cases were

relatively poor Hispanic women; controls were matched by age, race or ethnicity and hospital, and had comparable levels of income and education.

The researchers adjusted for age at first intercourse, number of lifetime partners, douching, parity and history of infertility, and found the risk of ectopic pregnancy to be 2.4 times higher among women with past chlamydial infection. Current practice of douching also was an independent risk factor: Women who douched were 2.1 times more likely than others to have an ectopic pregnancy. More study is needed, though, to determine why women douche, what type of solution they use, how often it is applied, and whether douching may increase the risk of pelvic inflammatory disease and ectopic pregnancy by introducing bacteria into the upper genital tract or by causing changes in the vaginal flora.

Cases were more likely than controls to have a history of ectopic pregnancy, surgery and infertility, and they were more likely to report having had pelvic inflammatory disease, gonorrhea, venereal warts and chlamydia. History of IUD use was more common among cases, as was current and past douching. Cases also had a lower mean age at first intercourse than controls (17.2 compared with 19.8).

Age at first intercourse, number of lifetime sexual partners, history of douching, history of infertility and nulliparity were identified as confounding variables for chlamydial infection. The effect of chlamydial infection on the risk of ectopic pregnancy appeared to be stronger among nulliparous women, those with no history of sexually transmitted diseases and those with no history of douching.

The investigators suggest that the current epidemic of ectopic pregnancies might be slowed by preventing chlamydial infections and by discouraging douching. They observe that the U.S. rate of ectopic pregnancy was 15.2 per 1,000 reported pregnancies in 1985, representing a fourfold increase since 1970. In addition, the annual cost associated with ectopic pregnancy in 1985 was \$462 million. Thus, they conclude, "there is a strong need to identify the most effective means of reducing ectopic pregnancy rates."—M. Witwer

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Cesarean Section Rates, Reasons for Operations Vary Between Countries

Cesarean section rates vary widely around the world, ranging from 32 percent of hospital deliveries in Brazil to seven percent in Czechoslovakia, according to data from 21 countries on the frequency of and reasons for cesarean section operations between 1975 and 1986.¹ Rates of forceps and vacuum extraction deliveries in 14 countries also vary widely: Sixteen percent of deliveries in Canada and two percent in Czechoslovakia were performed using one of these techniques. While cesarean rates have risen in most countries as operative vaginal deliveries rates have fallen, there are major exceptions, notably in Sweden, where the rates have stabilized, and the Netherlands, where rates of both cesarean and operative deliveries are rising. There are also variations between countries in cesarean rates according to the complications leading to cesarean delivery, although cesarean rates for multiple births and breech deliveries have risen steeply in almost every country during 1980-1985. No significant relationship was found between rates of cesarean section and perinatal mortality.

Questionnaires on delivery methods were sent to government and university researchers in 29 developed and developing countries or territories; a total of 21 countries responded. Either a complete count or a nationally representative sample of births for the most recent year for which data were available was provided by 15 countries: Brazil (1981-1986), Canada (1984-1985), Czechoslovakia (1986), Denmark (1983), England and Wales (1985), Greece (1983), Hungary (1985), Japan (1985), the Netherlands (1985), New Zealand (1985), Norway (1985), Puerto Rico (1984-1985), Scotland (1985), Sweden (1985) and the United States (1985). The data for the remaining countries either were from only certain states or provinces (Australia, West Germany and Spain, all data from 1985) or were nonrepresentative hospital data (Italy, 1982; Portugal, 1987; and Switzerland, 1983-1986).

Brazil has the highest rate of cesarean-section deliveries of the countries surveyed (32 percent of hospital deliveries between 1981-1986). Even though nearly one-fifth of Brazilian deliveries are not in hospitals, the country's cesarean rate remains very high (26 percent) when calculated based on all deliveries. Puerto Rico has the second highest rate (29 percent), followed by the United States as a whole (23 percent)

and Canada (19 percent). The average rate among the countries surveyed, however, is 10-13 percent; two countries (Czechoslovakia and Japan) have rates below 10 percent. The cesarean rate in the Netherlands is 10 percent of hospital deliveries, but because of the many home births in this country, the rate for all births is only seven percent.

There is no clear relationship between rates of cesarean section and 1985 perinatal mortality. In England and Wales, for example, the perinatal mortality rate and cesarean rate are both 10 percent. On the other hand, Hungary's cesarean rate (10 percent) is nearly half its perinatal mortality rate (19 percent) while in the United States, the cesarean section rate (23 percent) is more than double the perinatal mortality rate (10 percent). Perinatal mortality rates and cesarean section rates were not significantly correlated, suggesting that low levels of infant mortality are compatible with low cesarean rates. The author notes, however, that such comparisons are limited because of the many other factors influencing perinatal mortality.

Trend data on cesarean sections indicate that the rates of increase seen in most countries during the 1970s have slackened. A comparison of the changes in cesarean rates for nine countries shows that the increases of 1981-1985 were not as sharp as those of 1976-1980. In fact, the average annual increase for these nations dropped almost by half, from nine percent in 1976-1980 to five percent in 1981-1985. Sweden is the only country in which the cesarean rate has leveled off: The annual growth in the cesarean rate was 19 percent from 1973-1977, but the cesarean rate itself has since stabilized, rising no higher than 12 percent and falling no lower than 11 percent. The growth rates of cesarean deliveries also decreased by one-half or more between 1975-1980 and 1980-1985 in Canada, Denmark, England and Wales, and by one-fourth or less during the same period in Hungary and the United States.

In the United States and Canada, a cesarean section is often recommended solely because the patient had one previously. Data from eight countries reveal a growing tendency to allow women to deliver vaginally after having had a previous cesarean, although there are still major variations. In the United States and New Zealand, the percentage of women with a previous cesarean who delivered vaginally rose by 14 percent between 1980-1985, and this rate increased by 10 percent in Canada during the same period. However, these countries had had the lowest initial rates,

so despite these increases, overall rates of vaginal births after cesareans in the United States and Canada remain below seven percent. Rates are much higher in several European countries: In Hungary, 33 percent and 32 percent of women who had had a previous cesarean section delivered vaginally in 1980 and 1985, respectively, as did 59 percent and 55 percent of Dutch women in those two years.

The United States has the highest cesarean section rates for multiple births (55 percent), followed by Denmark (43 percent), Sweden (42 percent) and West Germany (40 percent). Sharp increases in the cesarean rate for this complication could be seen for all countries except Sweden, but that country has the highest cesarean section rate for breech presentation (93 percent), followed by the United States (80 percent), West Germany (80 percent), Denmark (75 percent) and Canada (69 percent). The Netherlands has the lowest cesarean rate for this complication (35 percent). Sweden also has the highest cesarean rate (44 percent) for low-birthweight infants, followed by Denmark (41 percent) and West Germany (35 percent). The U.S. cesarean rate for low-birth-weight infants was not available, but at least one U.S. state reported a sharp increase in cesarean sections for this complication.

Wide differences between countries are also found in rates of cesarean sections performed due to hypertension: Canada and the United States have fairly steady rates of around 40 percent; the rate for the Netherlands is only 17 percent, but is growing rapidly. The rate of cesarean section because of fetal distress in the United States is 55 percent, but rates for Canada, Denmark and the Netherlands are about half that. Rates of cesareans due to fetopelvic disproportion are 80 percent or higher for all countries except the Netherlands (79 percent) and Denmark (71 percent).

In most countries, rates of forceps and vacuum extraction deliveries (known as operative deliveries) are significantly lower than cesarean rates: In the United States, Canada, West Germany and England and Wales, the rates of operative vaginal deliveries have declined over time as cesarean rates have risen. Canada reports the highest operative vaginal rate (16 percent) as well as one of the highest cesarean rates (19 percent). The operative vaginal delivery rate for the United States is 11 percent, while the cesarean rate (23 percent) is much higher. Czechoslovakia on the other hand, has the lowest reported operative vaginal delivery rate as well as the lowest cesarean section rate (two per-

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cent and seven percent, respectively). In Sweden, the two rates have risen together and then leveled off (the operative vaginal delivery rate at seven percent and the cesarean section rate at 12 percent); in the Netherlands, both rates have been increasing for 10 years (they are now 11 percent and 10 percent, respectively).

Cesarean rates in Brazil, Puerto Rico and the United States have approached or exceeded the level of one for every four births; if increases continue at these levels, cesarean rates will double in only nine years in Norway and in 11 years in the United States. The researcher notes that countries wishing to slow their cesarean rate might observe obstetric practices in Sweden, the only surveyed country where the cesarean rate has stabilized.—R. Turner

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Many Canadian Women Are Delaying Marriage, Opting for Cohabitation

Increasing numbers of Canadian women have been delaying marriage and cohabiting before marriage, according to data from the Canadian Fertility Survey of 1984.¹ Younger women are forming unions at the same age and rate as older women did, but they appear to be choosing cohabitation over marriage for their first union. However, older women tend to cohabit for longer periods than do younger women. Canadian women who are younger than 25, live in large cities, have a university education and show low levels of religious commitment are more likely than others to delay marriage. Women who had a premarital birth as a teenager are less likely to delay marriage, while those who had a premarital birth at an older age are more likely to delay marriage. In general, cohabitation appears to delay marriage.

The Canadian Fertility Survey (CFS) was conducted using random telephone interviews from April through June of 1984; a total of 5,305 women participated. Each respondent was asked if she had ever lived with a partner without being married. If the answer was yes, she was asked to give

the age when cohabitation began and the length of cohabitation. About 21 percent of all women in the study had cohabited by age 29, and about eight percent said they were living with a partner at the time of the interview. Nine percent of the entire sample had had at least one premarital birth. Twenty-two percent of the women were born between 1960 and 1966, 40 percent between 1950 and 1959 and the remainder between 1935 and 1949. Sixty-four percent were from urban areas, 37 percent had at least a high school education and 26 percent attended church regularly. Twenty-four percent and 27 percent, respectively, were of English and French ethnicity; the remaining women were of Irish, German, Italian, Ukrainian, Dutch, Polish or other background.

The CFS sample includes 1,463 women who had ever cohabited, 46 percent of whom were currently married and 38 percent of whom were never married. Seventy-five percent cohabited before their first marriage.

Length of cohabitation was analyzed by birth cohort, using only those 1,093 respondents (21 percent of the sample) who had cohabited before their first marriage. Younger Canadian women tended to have cohabited for shorter periods: For the 1960–1966 birth cohort, 34 months was the mean; for the 1950–1959 and 1935–1949 birth cohorts, the mean lengths were 54 months and 73 months, respectively. Among women who married their cohabitation partner, the mean length of cohabitation was 30 months, no matter what the birth cohort. About 22 percent of women from the 1960–1966 birth cohort who had cohabited married their partner, compared to 44 percent of women in earlier cohorts.

A life-table analysis reveals that women in the 1960–1966 birth cohort were more likely than women in older cohorts to have cohabited in their first union. Their cumulative probability of cohabiting by age 20 was about .28; for the 1950–1959 and 1935–1949 age-groups, the corresponding probabilities were .16 and .02. However, the researcher points out that if cohabitation and marriage are considered together, rates of union formation in Canada have not changed significantly. It is not the age at union formation but the type of union that has changed over time. (One possible effect of this change is lower fertility among cohabiting women: Those who had ever cohabited expected an average of 1.9 children, whereas those who had not expected an average of 2.3 children).

A multivariate analysis revealed that Canadian women born in the 1950s and

1960s were less likely to have married than were women born prior to 1950. The 1960–1966 birth cohort had a likelihood of first marriage 43 percent lower than those of the other two cohorts. Living in a large urban area (such as Toronto, Montreal or Vancouver) reduced the likelihood of first marriage by 73 percent. Among those women with at least a college education, likelihood of first marriage was 92 percent lower than for women with a high school education or less. Regular church attendance increased the chance of first marriage slightly (by 10 percent). Women of French Canadian background had the lowest likelihood of first marriage of all surveyed ethnic groups; they had a 22 percent lower likelihood of first marriage than women of English descent and a 15 percent lower likelihood than women of other ethnic backgrounds.

Among Canadian women who had had a premarital birth when they were between 12 and 15 years old, the probability of marrying for the first time between the ages 12 and 18 was almost six times greater than that of women with no premarital birth. However, this trend was reversed by ages 21–22: Those who had had a premarital birth between ages 12 and 20 had significantly lower chances (41 percent) of marrying by ages 21–22.

The likelihood of first marriage declined significantly with cohabitation at older ages: For those who cohabited between ages 13 and 20, the chance of marrying by ages 21–22 was reduced by 25 percent, while for those who cohabited between ages 13 and 24, the chance of marrying by ages 25–26 was reduced by 36 percent. In general, it appears that cohabiting women were less likely to marry, or tended to marry later, than were women who had never cohabited.

According to the researcher, the data show that although the majority of young Canadian women are marrying later, they are not all choosing to be single. Rather, they are forming cohabiting unions—most of them prior to marriage, but some instead of marriage. Their older counterparts, in contrast, were more likely to marry when forming unions. The increase in women's involvement in the labor force might be a major reason for the decline in marriage rates, the researcher concluded, as it gives women the financial independence that enables them to delay marriage.—R. Turner

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Books in Review

A Less Than Complete Guidebook

Your Complete Guide to Sexual Health

by Elizabeth Thompson Ortiz (for Planned Parenthood of San Diego and Riverside Counties), Prentice Hall, Englewood Cliffs, N.J., 1989, \$24.95 (cloth), \$18.95 (paper),* 344 pp.

Reviewed by Debra W. Haffner

Your Complete Guide to Sexual Health is intended as "a comprehensive family reference book on reproductive health and sexuality, written in simple, nontechnical language . . . a book that all members of the family would find easy to read, and that would answer most questions about the human reproductive system, how it works, and the health problems related to it" [p. vii]. Unfortunately, because the book tries to reach readers of all ages and provide information on all topics, it establishes an impossible goal; this would be a useful and informative book if its approach were more modest. Perhaps more critically, the book confuses sexual health with reproductive health.

Author Elizabeth Thompson Ortiz is at her best when covering reproductive health topics. The chapters on pregnancy and childbirth, infertility, contraception, abortion and sexually transmitted diseases (STDs) are well-written and provide the general reader with useful information. The organization of several of these chapters is superb: Short, standardized questions are followed by succinct answers. For example, in the discussion of health problems during pregnancy, separate sections address such questions as "What is it?" "What are the signs and symptoms?" "What is the treatment?" and "What are the aftereffects?" More information on cesarean sections would have been helpful, considering that nearly one-quarter of births in the United States are delivered

this way. The section on breastfeeding is well-balanced, and the graphics in this chapter are helpful and encouraging, although parents-to-be would need to supplement this material with more in-depth reading.

As might be expected from a book written for Planned Parenthood, the chapter on reversible contraceptives is excellent. Each method is discussed in detail, with sections on how it works and on its effectiveness, advantages, problems, risks and benefits. These sections would have been strengthened, though, by the addition of questions and answers on the impact of each method on sexual relationships. The discussions of sterilization and abortion are also well-handled.

The chapters on women's and men's health problems are useful, with the emphasis on self-care and self-examination for both men and women especially appreciated. The discussion of specific disorders is well-organized, and the sections on treatments for these explain not only the procedures and recovery expectations but the impact of the treatments on sexual functioning.

The chapter on STDs presents the same kind of useful organization found in earlier chapters. I found it offensive, however, that the author devoted a separate section to "Homosexual Men and STDs," implying that heterosexuals engaging in certain types of sexual behavior might be less likely to be exposed to intestinal infections or hepatitis than homosexuals participating in the same types of behavior.

In the chapter on talking to children, Ortiz explains clearly why early sexuality education is important and she acknowledges the difficulty in providing this type of education, the importance of informing both sons and daughters and the need to avoid waiting for children to ask questions about sex. The section on presenting one's own family values is excellent. I disagreed, though, with many of the chronological ages suggested for sharing information: Ortiz proposes teaching children the correct terms for the genitals at ages 3-5, although surely parents have taught them the names of other parts of the body prior to age two. (My own daughter was able to point out her elbow, nose and vulva by 18 months.) Ortiz also suggests explaining where babies come from when children are at age five, even though most children begin asking these questions much earlier.

Unfortunately, the quality of the material on human sexuality is mixed at best. The section on raising sexually healthy infants will reassure parents who have

questions about infant and toddler masturbation and about teaching children about their sexual identity. It would have been helpful, though, if Ortiz had included more information on the impact of early sex-role stereotyping through toys, childhood play, television and advertisements. In addition, the book jumps from a discussion of sex play among five-year-olds to a discussion of adolescence, which indicates that the author accepts the outdated notion that there is a latency period between age six and adolescence.

Furthermore, the information on sexual activity during adolescence reflects a pattern of teenage sexuality that no longer exists for many young people. Ortiz states that sexual exploration "usually follows a pattern of slowly increasing intimacy" [p. 37], from kissing to necking to petting to intercourse, but research on teenage sexual behavior in the 1980s clearly indicates that many teenagers move quickly from kissing to intercourse, with the percentages reporting intercourse larger than the percentages reporting noncoital sexual behavior.¹ In addition, only one paragraph in this section acknowledges that not all teenagers are heterosexual.

Moreover, the information on teenage sexuality inadvertently reinforces many sex-role stereotypes. Ortiz writes that "some boys and men believe that when a woman says 'no,' she sometimes means 'yes'" [p. 38], but Ortiz does not allow for the possibility that young men are often pressured into having sexual intercourse and that young women must also accept "no" as an answer. She also does not discuss the importance for both sexes of limit-setting, negotiating and communicating.

In the section on adult sexual response, the discussion of communication in healthy sexual relationships is excellent, although it concentrates too strongly on intercourse as the endpoint of sexual behavior and on orgasm as the desired outcome. Even parts of the body are defined in terms of heterosexual intercourse: The vagina is described as "the part of the woman's body that is entered by the man's penis during sexual intercourse" [p. 5]. Oral intercourse is discussed as something one does prior to genital intercourse and orgasm, and manual stimulation as something to be used when one partner wants intercourse but the other does not or is unable to. Clearly, in both situations, one person can give pleasure to another for

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**Your Complete Guide to Sexual Health* is available to Planned Parenthood affiliates at a price of \$9.00 each, or at \$5.39 each for orders of 20 or more.

pleasure's own sake, not only as a prelude to or replacement for the "main event."

The section on sexual dysfunctions is helpful but brief. Many readers would have been reassured by the inclusion of an introductory section explaining that at one time or another, almost everyone experiences a lack of desire or is unable to have an orgasm or erection. A major shortcoming of this chapter is that it alludes to inhibited sexual desire, the leading sexual dysfunction in the United States, only in one paragraph about boredom. Although the section on sex therapy is well-handled, it would have been better if it had included advice on how to evaluate the training and certification of sex therapists. A section on "Common and Uncommon Variations in Sexual Behavior" is confusingly organized, with discussions of nudity, erotica and sex toys interspersed with paragraphs on prostitution, exhibitionism and bestiality; moreover, transsexualism is incorrectly placed in this section beside discussions of voyeurism, sadomasochism and fetishism.

The book's discussions of sexual orientation are the most troubling, in that they are heterosexually slanted in tone and presentation. One paragraph in the section on teenagers states that "teenagers who focus exclusively on homosexual relationships and have few or no contacts with the opposite sex could develop a preference for homosexuality," incorrectly presenting sexual orientation as a preference based on exposure. Only two pages on homosexuality follow in a later section, bisexuality is discussed in only one paragraph, and although the author presents rejected theories from the past about the "causes of homosexuality," there is no mention of current thinking on the subject. Gay, lesbian and bisexual readers will find little help or comfort in this "complete guide."

Indeed, one is never sure of the book's intended audience. At times, it seems aimed at heterosexual adolescents and young adults, at other times at midlife and older adults. The chapter on "Unplanned and Unwanted Pregnancy" seems directed solely at unmarried adolescents: The picture on the chapter's first page is the familiar one of a very young woman and her newborn, and the options presented assume that the readers are young, unmarried and probably living with their parents. The chapter provides very good counsel to this group, but its tone and content are inapplicable to adult women faced with an unplanned pregnancy.

Ortiz warns in the preface that some of the facts "may be out of date by the time the reader sees them" [p. vii]. Although

this is undoubtedly why the most recent information on such topics as chorionic villus biopsy, RU 486 and human immunodeficiency virus (HIV) prophylaxis is lacking, it does not explain why many of the suggested additional readings at the end of each chapter predate 1984. Ortiz also cautions in the chapter on AIDS that it was completed in December 1988, yet it must have been woefully outdated even before that time: She discusses "the AIDS virus," describes AIDS as a "fatal" disease, does not explain accurately the stages of HIV infection and emphasizes risk groups rather than risky behavior.

Additionally, AIDS is used several times as an excuse to moralize. In a discussion of extramarital sex, Ortiz states: "Because of AIDS, involvement in extramarital sex these days is potentially a very serious act" [p. 40]; when speaking of casual sex, she states that "this trend may reverse itself in the near future because we are now learning that those who choose casual sex as a lifestyle are at higher risk of STDs, such as gonorrhea, chlamydia, herpes and AIDS" [p. 41]. Extramarital sex does not place one at greater risk of HIV infection than does any other type of nonmonogamous relationship; it is unprotected sex with an infected partner that places one at risk, not the social context of the relationship.

One major drawback of the book is that feelings, a critical aspect of human sexuality, are rarely addressed: The chapter on the human body includes almost no discussion of people's feelings about the size, development and appearance of the genitals, the section on puberty never addresses young people's feelings about sexual development and the section on aging does not deal with feelings about menopause or sexuality and aging. The one paragraph on miscarriage (insensitively labeled "correcting mistakes") never confronts the intense emotions that people experience after a miscarriage, and sections on infertility and sexual dysfunction also skim over the profound effects of such situations.

Human sexuality deals not only with the anatomy, physiology and biochemistry of the sexual response system but with individuals' roles, identity, personality and their thoughts, feelings, behavior and relationships. This book, however, emphasizes anatomy, reproduction, contraception and STDs; the author reinforces the biological approach and pays little attention to the broader concept of human sexuality. Therefore, my reaction to it is mixed: Had it been titled *Your Complete Guide to Reproductive Health* and clearly directed to adolescents and young adults, it would have

received high marks; as a complete guide to sexual health, however, it falls short of its goals.

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Understanding and Responding to AIDS

AIDS: Sexual Behavior and Intravenous Drug Use

ed. by Charles F. Turner, Heather G. Miller and Lincoln E. Moses, National Academy Press, Washington, D.C., 1989, \$34.95 (cloth), \$24.95 (paper), 589 pp.

Reviewed by Jill G. Joseph

Perhaps the definitive encyclopedia of social science research on AIDS, the National Research Council's publication *AIDS: Sexual Behavior and Intravenous Drug Use* is an impressive work, remarkable in its size and scope. The book has three main sections, on transmission, intervention and impediments to research and intervention; it also includes six background papers on topics as diverse as the methodology for estimating the numbers of intravenous drug users and the cost-effectiveness of AIDS prevention programs. An introductory summary as well as appendices outlining the authors' recommendations and providing supplementary data complete the book.

It is sobering to note that virtually all the information needed to prevent further transmission of the human immunodeficiency virus (HIV) was documented five to seven years ago. Modes of transmission were well-described by then and remain unchanged. Furthermore, the methods for reducing risk were fairly obvious and were the focus of some of the earliest community-based interventions. Ongoing epidemiological and biomedical research is important, but it is tragically apparent that too little attention has been paid to the human and social issues underlying the epidemic. By addressing these concerns, *AIDS: Sexual Behavior and Intravenous Drug Use* becomes an extraordinarily important resource.

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The editors and authors provide substantial methodological discussions and specific data of importance to social scientists, in addition to general conclusions that a well-informed lay audience can understand. It is noteworthy that specialized terminology is avoided whenever possible and, when used, it is carefully defined. This painstaking treatment of potentially complex material makes the book genuinely useful to a broad range of readers.

Many of the authors' recommendations involve the development of federal or state policies that ought—at least ideally—to have thorough research underpinnings. For example, one hopes that the careful documentation provided here will stimulate final approval for the necessary surveys of adult sexual behavior. The need for such work is aptly demonstrated in the first section on "Understanding the Spread of HIV Infection." The editors offer a thorough overview of the sexual behavior surveys pioneered by Alfred Kinsey and his colleagues, describing Kinsey's work as "the most widely known and referenced data on American sexual behavior" [p. 84]; and they note that these important studies continue to provide the basis for prevalence estimates of sexual practices. They contend, however, that Kinsey's data were so flawed as to be "inappropriate even for the periods in which (they) were gathered" [p. 84]. Denunciation of "research quackery" is supported (perhaps unnecessarily) by a background paper criticizing surveys by Shere Hite.

On the other hand, the book carefully summarizes more valid data on adolescent and young adult sexuality. Particularly valuable are the efforts to develop a "time series" that describes changes in sexual behavior over a period of many decades. However, the paucity of valid data obtained from probability samples of American adults will seriously handicap our ability to understand, let alone respond to, the HIV epidemic.

An adequate response also requires more competent, experienced social scientists involved in research, evaluation and analysis of AIDS-related issues. Perhaps it is this broadly-based group of academics who may be most intrigued and informed by the book, which describes important gaps in the basic social science and behavioral data needed to effectively combat the epidemic. For example, the fourth chapter, "Facilitating Change in Health Behaviors," details the crucial need for well-designed evaluations of HIV interventions, which could help in the development of medical and policy recommendations. Because

these data are lacking, the editors draw on preexisting (albeit sometimes tangential) literature that provides at least potentially relevant data.

Basic principles concerning behavioral change and its maintenance are reviewed, and issues such as fear aroused by health messages, adoption and diffusion of innovations, self-efficacy, and social support are addressed. An enormous amount of applicable material exists, and the editors have sorted through it admirably; nonetheless, this discussion might have been strengthened by a greater emphasis on the HIV context and perhaps by inclusion of the methodological critiques that were so helpful earlier. Because the issues raised by HIV and by changes in sexual behavior or drug use are idiosyncratic, generalizations drawn from research on smoking cessation or cardiovascular problems are often inappropriate. The subsection "Impediments to Individual Action: The Example of Condom Use" successfully puts an important behavioral issue into the specific AIDS context, but an earlier and more general approach of this sort would have been welcome. There is a peculiar lack of methodological rigor in this discussion as well: Unlike the surveys of sexual behavior mentioned earlier, little attention is paid here to sampling and assessment methods.

This book is at once a carefully crafted scientific compendium of information and an eloquent plea for involvement by social scientists and policymakers. Nowhere is this more clear than in the section that explicitly deals with "Impediments to Research and Innovation." The text is remarkably candid when discussing barriers to prevention, such as conflict within the federal administrative structure about the realities of adolescent sexuality or the need for explicit language in AIDS prevention messages.

Especially valuable is the forthright discussion of HIV in the social contexts of poverty, race and the social marginalization that the AIDS stigma can impose. Examples from the past and from the present, such as the 1822 decision by Massachusetts General Hospital to exclude all patients with venereal disease and the more recent reluctance of the media and the government to advertise condoms on television, are both appalling and instructive. The editors also call for changes in research style and substance in order to address the epidemic more appropriately.

Yet it is not collegial involvement alone that is required. The text and recommendations in *AIDS: Sexual Behavior and Intravenous Drug Use* clearly document the need

for adequate support of basic social science research, based on a recognition of our need for data that are currently unavailable. For example, many in the AIDS field have lamented the unrealistic quality of epidemic projections and modeling, given the dearth of information regarding sexual behavior and intravenous drug use among American adolescents and adults.

Although the book's discussion of the barriers to improving research and prevention is limited, implicit throughout is the history of a difficult struggle. No one who reads this book can remain unimpressed by the multiplicity and complexity of these barriers. Social norms and strongly held beliefs regarding appropriate behavior and policy may impede effective responses to this epidemic for a long time to come. Other obstacles include the complex tangle of interagency collaborations, unnecessary institutional and personal competitiveness, standards for peer review that work against the publication of negative results, distrust of social science research, and inadequate funding. Nevertheless, the text carefully avoids political rhetoric, simplistic solutions or inappropriate indictments of past failures.

For this carefully written, well-organized and thoughtful contribution to our understanding of the HIV epidemic, the National Research Council, the editors and the authors are to be commended.

Correction

In "The Sexual and Reproductive Behavior of American Women, 1982-1988," by Jacqueline Darroch Forrest and Susheela Singh [22:206, 1990], five percentages given in the first paragraph of the middle column on page 209 were incorrect. The three sentences affected should read as follows: "Special tabulations of those who had had intercourse in the past 12 months show that 14 percent of women (and 29 percent of men) aged 18-44 said they had had two or more sexual partners in that time period. Moreover, 49 percent of women 18-19 (and 78 percent of all males in this age-group) had had multiple partners in a one-year period. The proportion then declines steadily with increasing age, to five percent of women aged 40-44 and to 14 percent of comparable males."

Some of the incorrect percentages were also reproduced in the boldface caption at the top of page 206, which should read the same as the last two sentences of this correction.

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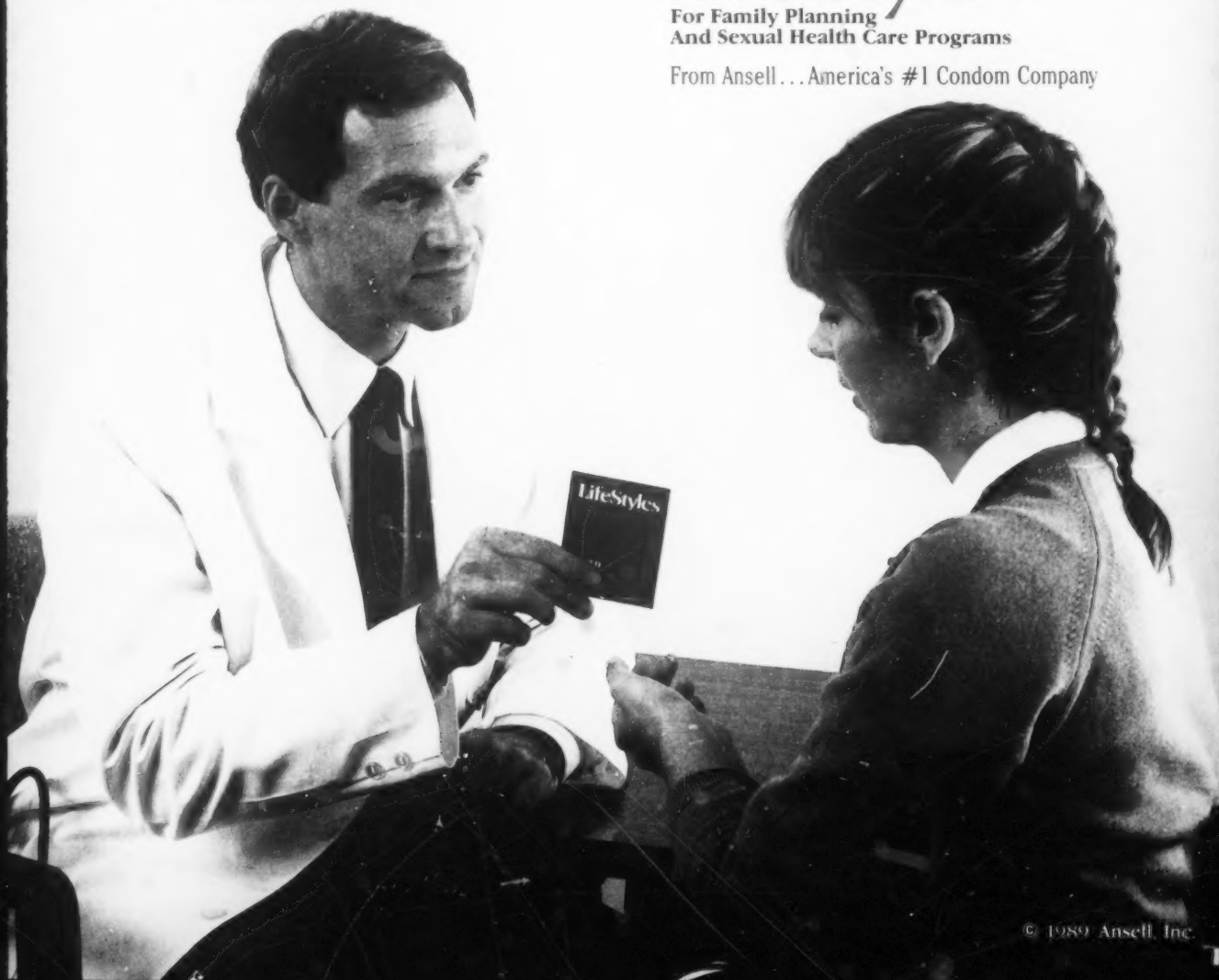
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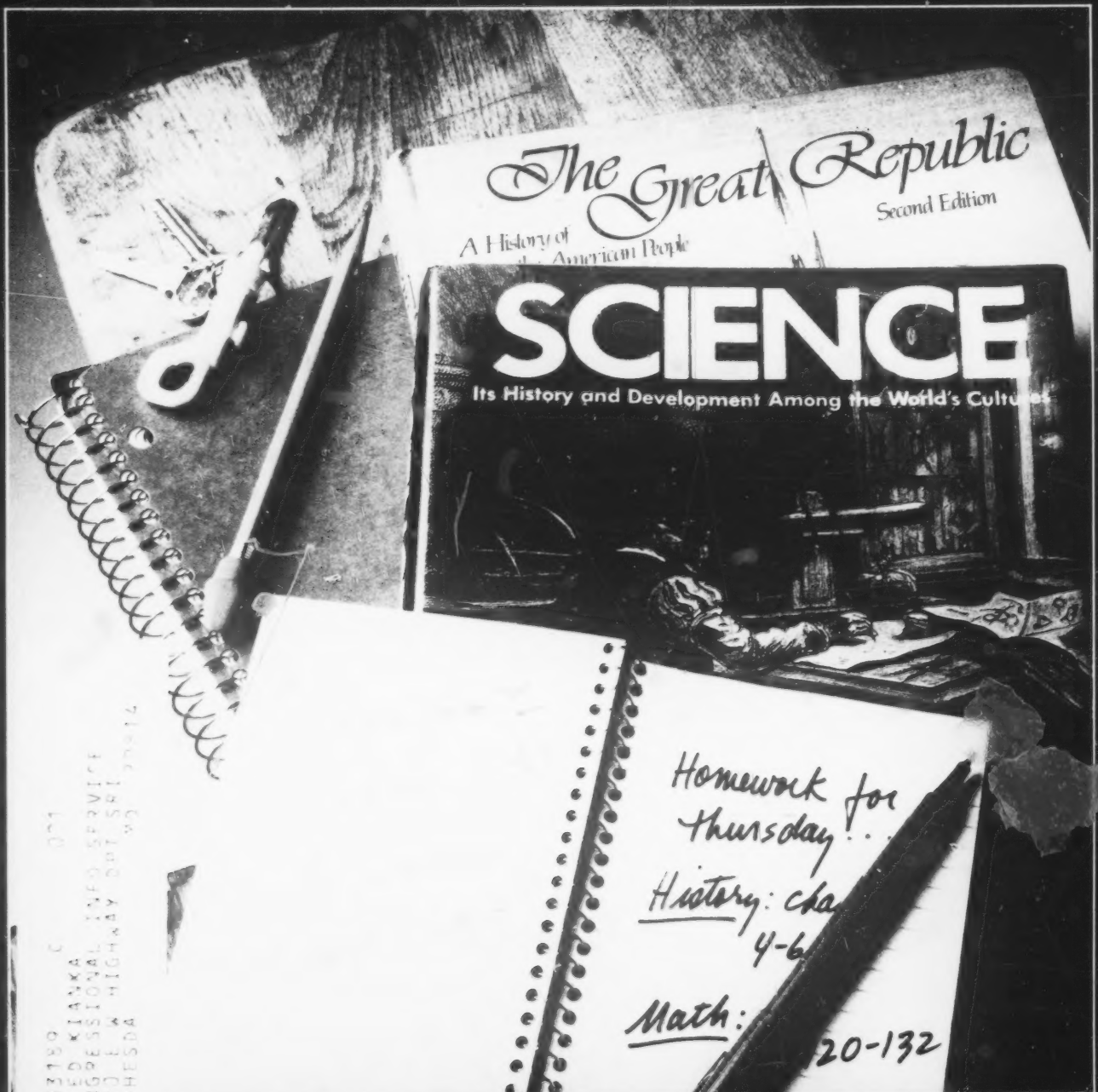
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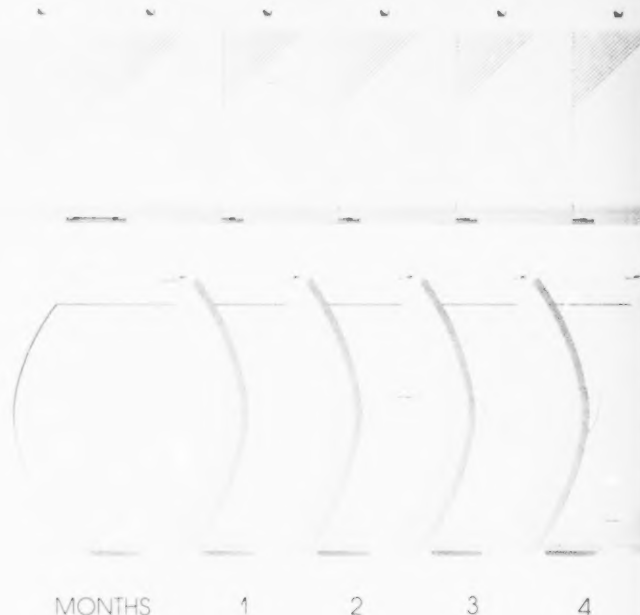
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WARNINGS

Cigarette smoking increases the risk of serious cardiovascular side effects from oral contraceptive use. This risk increases with age and with heavy smoking (15 or more cigarettes per day) and is quite marked in women over 35 years of age. Women who use oral contraceptives should be strongly advised not to smoke.

The use of OCs is associated with increased risks of several serious conditions including myocardial infarction, thromboembolism, stroke, hepatic neoplasia, and gallbladder disease, although the risk of serious morbidity or mortality is very small in healthy women without underlying risk factors. The risk of morbidity and mortality increases significantly in the presence of other underlying risk factors such as hypertension, hyperlipidemias, obesity and diabetes. Practitioners prescribing OCs should be familiar with the following information relating to these risks. The information contained in the package insert is principally based on studies carried out in patients who used OCs with higher formulations of estrogens and/or progestogens than those in common use today. The effect of long term use of the OCs with lower formulations of both estrogens and progestogens remains to be determined. Throughout this labeling, epidemiological studies reported are of two types: retrospective or case control studies and prospective or cohort studies. Case control studies provide a measure of the relative risk of a disease, namely, a ratio of the incidence of a disease among OC users to that among nonusers. The relative risk does not provide information on the actual clinical occurrence of a disease. Cohort studies provide a measure of attributable risk, which is the difference in the incidence of disease between OC users and nonusers. The attributable risk does provide information about the actual occurrence of a disease in the population. For further information, the reader is referred to a text on epidemiological methods. 1. **Thromboembolic Disorders and Other Vascular Problems:** a. **Myocardial Infarction:** An increased risk of myocardial infarction has been attributed to OC use. This risk is primarily in smokers or women with other underlying risk factors for coronary artery disease such as hypertension, hypercholesterolemia, morbid obesity, and diabetes. The relative risk of heart attack for current OC users has been estimated to be two to six. The risk is very low under the age of 30. Smoking in combination with OC use has been shown to contribute substantially to the incidence of myocardial infarction in women in their mid-thirties or older with smoking accounting for the majority of excess cases. Mortality rates associated with circulatory disease have been shown to increase substantially in smokers over the age of 35 and non-smokers over the age of 40 among women who use OCs. OCs may compound the effects of well-known risk factors such as hypertension, diabetes, hyperlipidemias, age and obesity. In particular, some progestogens are known to increase HDL cholesterol and cause glucose intolerance, while estrogens may create a state of hyperinsulinism. OCs have been shown to increase blood pressure among users (see section 9 in WARNINGS). Similar effects on risk factors have been associated with an increased risk of heart disease. OCs must be used with caution in women with cardiovascular disease risk factors. b. **Thromboembolism:** An increased risk of thromboembolic and thrombotic disease associated with the use of OCs is well established. Case control studies have found the relative risk of users compared to nonusers to be 3 for the first episode of superficial venous thrombosis, 4 to 11 for deep vein thrombosis or pulmonary embolism, and 15 to 6 for women with predisposing conditions for venous thromboembolic disease. Cohort studies have shown the relative risk to be somewhat lower: about 3 for new cases and about 4.5 for new cases requiring hospitalization. The risk of thromboembolic disease due to OCs is not related to length of use and disappears after pill use is stopped. A two to four fold increase in relative risk of postoperative thromboembolic complications has been reported with the use of OCs. The relative risk of venous thrombosis in women who have predisposing conditions is twice that of women without such medical conditions. If feasible, OCs should be discontinued at least four weeks prior to and for two weeks after elective surgery of a type associated with an increase in risk of thromboembolism and during and following prolonged immobilization. Since the immediate postpartum period is also associated with an increased risk of thromboembolism, OCs should be started no earlier than four to six weeks after delivery in women who elect not to breast feed.

c. **Cerebrovascular diseases:** OCs have been shown to increase both the relative and attributable risks of cerebrovascular events (thrombotic and hemorrhagic strokes), although in general the risk is greater among older (≥35 years), hypertensive women who also smoke. Hypertension was found to be a risk factor for both users and nonusers for both types of strokes, while smoking tended to increase the risk for hemorrhagic strokes. In a large study, the relative risk of thrombotic strokes has been shown to range from 1.7 for non-smokers to 1.4 for users with severe hypertension. The relative risk of hemorrhagic stroke is reported to be 1.7 for non-smokers who used OCs, 2.6 for smokers who did not use OCs, 7.6 for smokers who used OCs, 1.6 for non-smokers and 2.7 for users with severe hypertension. The attributable risk is also greater in older women. d. **Dose-related risk of vascular disease from OCs:** A positive association has been observed between the amount of estrogen and/or progestin in OCs and the risk of vascular disease. A decline in serum high density lipoproteins (HDL) has been reported with many progestational agents. A decline in serum HDL lipoproteins has been associated with an increased incidence of ischemic heart disease. Because estrogens increase HDL cholesterol, the net effect of an OC depends on a balance achieved between doses of estrogen and progestogen and the nature and absolute amount of progestogens used in the contraceptives. The amount of both hormones should be considered in the choice of an OC. Minimizing exposure to estrogen and progestogen is in keeping with good principles of therapeutics. For any particular estrogen-progestogen combination, the dosage regimen prescribed should be one which contains the least amount of estrogen and progestogen that is compatible with a low failure rate and the needs of the individual patient. New acceptors of OC agents should be started on preparations containing the lowest dose of estrogen which produces satisfactory results for the patient. e. **Persistence of risk of vascular disease:** There are two studies which have shown persistence of risk of vascular disease for ever users of OCs. In a study in the United States, the risk of developing myocardial infarction after discontinuing OCs persists for at least 9 years for women 40-49 years who had used OCs for 5 or more years, but this increased risk was not demonstrated in other age groups. In another study in Great Britain, the risk of developing cerebrovascular disease persisted for at least 6 years after discontinuation of OCs, although excess risk was very small. However, both studies were performed with OC formulations containing 50 micrograms or higher of estrogen.

2. **Estimates of Mortality from Contraceptive Use:** One study, gathered data from a variety of sources which have estimated the mortality rate associated with different methods of contraception at different ages. These estimates include the combined risk of death associated with contraceptive methods plus the risk attributable to pregnancy in the event of method failure. Each method of contraception has its specific benefits and risks. The study concluded that with the exception of OC users 35 and older who smoke and 40 and older who do not smoke, mortality associated with all methods of birth control is low and below that associated with childbirth. However, smokers 35 and older and non-smokers 40 and older who use OCs have an increase in mortality higher than those using other methods of birth control. These facts must be weighed in conjunction with failure rates for other methods and the risk associated with subsequent pregnancy.

3. **Carcinoma of the Reproductive Organs:** Numerous epidemiological studies have been performed on the incidence of breast, endometrial, ovarian and cervical cancer in women using OCs. The overwhelming evidence in the literature suggests that use of OCs is not associated with an increase in the risk of developing breast cancer, regardless of the age and parity at first use or with most of the marketed brands and doses. The Cancer and Steroid Hormone (CASH) study also showed no latent effect on the risk of breast cancer for at least a decade following long term use. A few studies have shown a slightly increased relative risk of developing breast cancer, although the methodology of these studies, which included differences in examination of users and nonusers and differences in age at start of use, has been questioned. Some studies suggest that OC use has been associated with an increase in the risk of cervical intraepithelial neoplasia in some populations of women. However, there continues to be controversy about the extent to which such findings may be due to differences in sexual behavior and other factors. In spite of many studies of the relationship between OC use and breast and cervical cancers, a cause and effect relationship has not been established.

4. **Hepatic Neoplasia:** Benign hepatic adenomas are associated with OC use, although the incidence of benign tumors is rare in the United States. Indirect calculations have estimated the attributable risk to be in the range of 33 cases/100,000 for users, a risk that increases after four or more years of use. Rupture of large, benign hepatic adenomas may cause death through intraabdominal hemorrhage. Studies from Britain have shown an increased risk of developing hepatocellular carcinoma in long term (>8 years) OC users. However, these cancers are extremely rare in the US; the attributable risk to the excess incidence of liver cancers in OC users approaches less than one per million users.

5. **Ocular Lesions:** There have been clinical case reports of retinal thrombosis associated with the use of OCs. OCs should be discontinued if there is, unexplained partial or complete loss of vision; onset of proptosis or diplopia; papilledema; or retinal vascular lesions. Appropriate diagnostic

and therapeutic measures should be initiated immediately.

6. **OC Use Before or During Early Pregnancy: Risk of Birth Defects:** Extensive epidemiological studies have revealed no increased risk of birth defects in women who have used OCs prior to pregnancy. Studies also do not suggest a teratogenic effect, particularly insofar as cardiac anomalies and limb reduction defects are concerned, when taken inadvertently during early pregnancy. The administration of OCs to induce withdrawal bleeding should not be used as a test for pregnancy. OCs should not be used during pregnancy to treat threatened or habitual abortion. It is recommended that for any patient who has missed two consecutive periods, pregnancy should be ruled out before continuing OC use. If the patient has not adhered to the prescribed schedule, the possibility of pregnancy should be considered at the time of the first missed period. OC use should be discontinued if pregnancy is confirmed. 7. **Gallbladder Disease:** Earlier studies have reported an increased relative risk of gallbladder surgery in users of OCs and estrogens. More recent studies, however, have shown that the relative risk of developing gallbladder disease among OC users may be minimal. The recent findings of minimal risk may be related to the use of OC formulations containing lower hormonal doses of estrogens and progestogens.

8. **Carbohydrate and Lipid Metabolic Effects:** OCs have been shown to cause glucose intolerance in a significant percentage of users. OCs containing greater than 75 micrograms of estrogen cause hyperinsulinism, while lower doses of estrogen cause less glucose intolerance. Progestogens increase insulin secretion and create insulin resistance; this effect varying with different progestational agents. However, in the nondiabetic woman, OCs appear to have no effect on fasting blood glucose. Because of these demonstrated effects, prediabetic and diabetic women should be carefully observed while taking OCs. A small proportion of women will have persistent hyperglycemia while on the pill. As discussed earlier (see WARNINGS 1a and 1d), changes in serum triglycerides and lipoprotein levels have been reported in OC users.

9. **Elevated Blood Pressure:** An increase in blood pressure has been reported in women taking OCs, and this increase is more likely in older OC users and with continued use. Data from the Royal College of General Practitioners and subsequent randomized trials have shown that the incidence of hypertension increases with increasing concentrations of progestogens. Women with a history of hypertension or hypertension-related diseases or renal disease should be encouraged to use another method of contraception. If women elect to use OCs, they should be monitored closely, and if significant elevation of blood pressure occurs, OCs should be discontinued. For most women, elevated blood pressure will return to normal after stopping OCs and there is no difference in the occurrence of hypertension among ever and never users.

10. **Headache:** The onset or exacerbation of migraine or development of headache with a new pattern which is recurrent, persistent or severe requires discontinuation of OCs and evaluation of the cause. 11. **Bleeding Irregularities:** Breakthrough bleeding and spotting are sometimes encountered in patients on OCs, especially during the first three months of use. Normorrhagic clots should be considered and adequate diagnostic measures taken to rule out malignancy or pregnancy in the event of breakthrough bleeding, as in the case of any abnormal vaginal bleeding. If pathology has been excluded, time or a change to another formulation may solve the problem. In the event of amenorrhea, pregnancy should be ruled out. Some women may encounter postpill amenorrhea or oligomenorrhea, especially when such a condition was prevalent prior to OC use.

PRECAUTIONS: 1. **Physical Examination and Follow-Up:** A complete medical history and physical examination should be taken prior to the initiation or resumption of OCs and at least annually during use of OCs. These physical examinations should include special reference to blood pressure, breasts, abdomen and pelvic organs, including cervical cytology, and relevant laboratory tests. In case of undiagnosed persistent or recurrent abnormal vaginal bleeding, appropriate diagnostic measures should be conducted to rule out malignancy. Women with a strong family history of breast cancer or who have breast nodules should be monitored with particular care. 2. **Lipid Disorders:** Women who are being treated for hyperlipidemias should be followed closely if they elect to use OCs. Some progestogens may elevate LDL levels and may render the control of hyperlipidemias more difficult. 3. **Liver Function:** If jaundice develops in any woman receiving such drugs, the medication should be discontinued. Steroid hormones may be poorly metabolized in patients with impaired liver function.

4. **Fluid Retention:** OCs may cause some degree of fluid retention. This should be considered with caution, and only with careful monitoring in patients with conditions which might be aggravated by fluid retention. 5. **Emotional Disorders:** Women with a history of depression should be carefully observed and the drug discontinued if depression recurs to a serious degree. 6. **Contact Lenses:** Contact lens wearers who develop visual changes or changes in lens tolerance should be assessed by an ophthalmologist. 7. **Drug Interactions:** Reduced efficacy and increased incidence of breakthrough bleeding and menstrual irregularities have been associated with concomitant use of rifampin. A similar association, though less marked, has been suggested with barbiturates, phenylbutazone, phenytoin sodium and possibly with griseofulvin, ampicillin and tetracyclines.

8. **Interactions with Laboratory Tests:** Certain endocrine and liver function tests and blood components may be affected by OCs: a. increased prothrombin and factors VII, VIII, IX and X; decreased antithrombin; c. increased norepinephrine induced platelet aggregability; b. increased thyroid binding globulin (TBG) leading to increased circulating total thyroid hormone as measured by protein-bound iodine (PBI), T4 by column or by radioimmunoassay. Free T4 serum uptake is decreased reflecting the increased TBG; free T4 concentration is unaffected; c. Other binding proteins may be elevated in serum. d. Sex binding globulins are increased and result in elevated levels of total circulating sex steroids in cord blood; however, with conditions which might be aggravated by fluid retention. e. Triglycerides may be increased. f. Glucose tolerance may be decreased. g. Serum folate levels may be depressed by OC therapy. This may be of clinical significance if a woman becomes pregnant shortly after discontinuing OCs.

9. **Carcinogenesis:** See WARNINGS section. 10. **Pregnancy:** Pregnancy Category X. See CONTRAINDICATIONS and WARNINGS sections. 11. **Nursing Mothers:** Small amounts of OC steroids have been identified in the milk of nursing mothers and a few adverse effects on the child have been reported, including jaundice and breast enlargement. In addition, OCs given in the postpartum period may interfere with lactation by decreasing the quantity and quality of breast milk. If possible, the nursing mother should be advised not to use OCs but to use other forms of contraception until she has completely weaned her child.

INFORMATION FOR THE PATIENT: See patient labeling. **ADVERSE REACTIONS:** An increased risk of the following serious adverse reactions has been associated with the use of OCs (see WARNINGS section). Thrombophlebitis, arterial thromboembolism, pulmonary embolism, myocardial infarction, cerebral hemorrhage, cerebral thrombosis, hypertension, gallbladder disease, hepatic adenomas or benign liver tumors. There is evidence of an association between the following conditions and the use of OCs, although additional confirmatory studies are needed: Mesenteric thrombosis, retinal thrombosis. The following adverse reactions have been reported in patients receiving OCs and are believed to be drug related: nausea, vomiting, gastrointestinal symptoms (such as abdominal cramps and bloating), breakthrough bleeding, spotting, change in menstrual flow, amenorrhea, temporary infertility, after discontinuance of treatment, edema, melasma which may persist, breast changes, tenderness, enlargement, secretion, change in weight (increase or decrease), change in cervical erosion and secretion, dysmaturia in lactation when given immediately postpartum, cholestatic jaundice, migraine, rash (allergic), mental depression, reduced tolerance to carbohydrates, vaginal candidiasis, change in corneal curvature (steepening), intolerance to contact lenses. The following adverse reactions have been reported in users of OCs and the association has been neither confirmed nor refuted: Premenstrual syndrome, cataracts, changes in appetite, optically like syndrome, headache, nervousness, dizziness, hirsutism, loss of scalp hair, erythema multiforme, erythema nodosum, hemorrhagic eruption, vaginitis, porphyria, impaired renal function, hemolytic uremic syndrome, Budd-Chiari syndrome, acne, changes in libido, cataracts. While the following adverse reactions in conditions have been reported, no association with the use of OCs, no causal relationship has been established: Congenital anomalies, Raynaud's disease, sickle cell disease, mitral valve prolapse, increased risk of developing venous thromboembolic disease among women with blood types A, B or AB as opposed to women with blood type O.

OVERDOSAGE: Serious effects have not been reported following acute ingestion of large doses of OCs by young children. Overdosage may cause nausea and withdrawal bleeding may occur in females. **HOW SUPPLIED:** Loestrin® 21 120 is available in dispensers each containing 21 tablets. Each tablet contains 1 mg of norethindrone acetate and 20 mcg of ethinyl estradiol. Available in packages of five dispensers. Loestrin® Fe 120 is available in dispensers each containing 21 white tablets and 7 brown tablets. Each white tablet contains 1 mg of norethindrone acetate and 20 mcg of ethinyl estradiol. Each brown tablet contains 75 mg ferrous fumarate. Available in packages of five dispensers. Loestrin® 21 15/30 is available in dispensers each containing 21 tablets. Each tablet contains 15 mcg of norethindrone acetate and 30 mcg of ethinyl estradiol. Available in packages of five dispensers. Loestrin® Fe 15/30 is available in dispensers each containing 21 green tablets and 7 brown tablets. Each green tablet contains 15 mcg of norethindrone acetate and 30 mcg of ethinyl estradiol. Each brown tablet contains 75 mg ferrous fumarate. Available in packages of five dispensers.

Caution: Federal law prohibits dispensing without prescription.

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UPDATE

Fetal Tissue Panel Organized

The American College of Obstetricians and Gynecologists (ACOG) and the American Fertility Society (AFS) announced on January 7 that they would assemble a 15-member board to establish ethical standards for research involving human embryos and fetal tissue.¹ The panel is expected to consist of scientists, ethicists, lawyers and religious leaders. Federally funded fetal research has been banned in the United States since 1988, and Congressional and federal boards on biomedical ethics have been dissolved. Independently financed research has continued, though, and the ACOG-AFS panel may be the only such entity to provide ethics advice to scientists conducting such research. Howard Jones, leader of the AFS ethics commission, has said that the joint panel will fill an important void: "The federal government has missed the opportunity to take the lead in establishing standards for research on fetal tissue and the new reproductive technologies."²

1. P. J. Hiltz, "Groups Set Up Panel on Use of Fetal Tissue," *New York Times*, Jan. 8, 1991, p. C2; and S. Squires, "Advisory Board to Monitor Embryo, Fetal Tissue Research," *Washington Post*, Jan. 8, 1991.

2. *Ibid.*

Infant Death and Unwed Mothers

Infants born out of wedlock are considerably more likely to die than those born within marriage, even where obstetric and newborn care are readily available.¹ Analyzing Iowa state vital statistics data, researchers found that in 1986, for example, infant and neonatal deaths among unmarried mothers represented 15 percent of all live births, but 24 percent of infant and neonatal deaths. In addition, unmarried mothers were significantly more likely to have had a baby of low birth weight. Throughout the 10-year period, mortality

rates among babies born at or near term were significantly higher among children born to unmarried women than among all infants; neither age nor education explained the association. Furthermore, although unwed mothers had made significantly fewer prenatal visits than had other mothers, even those who had made a sizable number of visits experienced rates of infant and neonatal mortality that were significantly higher than among the offspring of married women.

1. H. A. Hein, L. F. Burmeister and K. A. Papke, "The Relationship of Unwed Status to Infant Mortality," *Obstetrics & Gynecology*, 76:763, 1990.

All OCs/Lessen Menstrual Pain

Oral contraceptive use has been demonstrated to reduce pain during menstruation, and new data show that this occurs regardless of the type of pill used.¹ A Swedish longitudinal study analyzed menstrual pain and oral contraceptive use among 596 women aged 19 surveyed in 1981 and 489 who were resurveyed in 1986. At age 19, among those who could identify their brand of oral contraceptive, menstrual pain was significantly less prevalent and less severe among women using monophasic pills (regardless of the progestogen dose) than among those using no hormonal method or the IUD. At age 24, users of monophasic or triphasic preparations all experienced significantly less menstrual pain than nonusers of oral contraceptives. Furthermore, women not using the pill in 1981 but using it in 1986 had significantly less menstrual pain in the latter year than in the former. However, in no case did users of any particular pill formulation experience significantly less pain than users of any other formulation.

1. I. Milson, G. Sundell and B. Andersch, "The Influence of Different Combined Oral Contraceptives on the Prevalence and Severity of Dysmenorrhea," *Contraception*, 42:497, 1990.

AIDS in Europe

As of March 31, 1990, more than 35,000 Eastern and Western Europeans had developed AIDS, according to the U.S. Centers for Disease Control, an increase of 62 percent over the number of AIDS cases reported at the same time in 1989.¹ Forty-six percent were homosexual or bisexual men, 30 percent were intravenous drug users, eight percent had had intercourse with someone infected or at risk of infection with the human immunodeficiency virus (HIV) and 16 percent presumably became infected in some other way. Thirteen percent of AIDS cases among adults (34,177 in all) were among women; of these, 56 percent were intravenous drug users, 26 percent had had intercourse with someone infected or at risk of infection with HIV, 12 percent had had transfusions and six percent were classified as having been infected in some other way. Switzerland has the highest AIDS incidence rate (190 cases per million population), followed by France (173 per million), Spain (135 per million), Denmark (112 per million) and Italy (105 per million). The comparable rate in the United States is 516 per million. In addition, there are 1,199 European children with AIDS, 36 percent of them from Romania and 47 percent from France, Italy and Spain.

1. "Update: Acquired Immunodeficiency Syndrome—Europe," *Morbidity and Mortality Weekly Report*, 39:850, 1990.

Drug Abuse and HIV Infection

New mothers from an inner-city area who tested positive for cocaine at the time of delivery were much more likely to be infected with syphilis or with the human immunodeficiency virus (HIV) than those who were not using cocaine.¹ In addition, cocaine users infected with syphilis or HIV were less likely than infected nonusers to

have received prenatal care. Urine screening was conducted among 1,206 women who gave birth at a New York City hospital between October 1988 and March 1989; 13 percent proved to have used cocaine and 1-2 percent had used opiates or marijuana. Nineteen percent of the women who tested positive for cocaine use also had syphilis, compared with two percent of those who had not been using cocaine. Blood samples were available for 480 of the women: Nearly eight percent of those testing positive for cocaine use were infected with HIV, compared with one percent of those testing negative for cocaine use. Half of the women who were seropositive for HIV had received prenatal care, compared with 85 percent of those who were seronegative; comparable proportions for syphilis were 29 percent and 72 percent, respectively. The researchers contend that "interim prevention efforts should begin to focus on the treatment of cocaine use, since it may be contributing substantively to the spread of syphilis and HIV and to the failure of patients to receive counseling and treatment."

1. H. L. Minkoff et al., "The Relationship of Cocaine Use to Syphilis and Human Immunodeficiency Virus Infections Among Inner City Parturient Women," *American Journal of Obstetrics and Gynecology*, 163:521, 1990.

Chlamydia Is Not Gonorrhea

Men and women infected with chlamydia differ substantially from those infected with gonorrhea, according to a recent Colorado study: The former were more likely to be white or Hispanic, more likely to be under age 25, less highly concentrated geographically and more likely to be asymptomatic.¹ Nearly all clients visiting a Colorado health department's sexually transmitted disease (STD), prenatal or family planning clinics in 1988 were tested for chlamydia and for gonorrhea. Of 243 men and 268 women who were definitely or probably infected with chlamydia, 60 percent and 84 percent were younger than 25; in contrast, 48 percent and 70 percent of men and women infected with gonorrhea were under age 25. Men and women with chlamydial infections were also more likely than those with gonorrheal infections to be white (62 percent and 60 percent, respectively, compared with 40 percent and 47 percent), and more likely to be Hispanic (14 percent and 24 percent, respectively, compared with seven percent and nine percent). In addition, those infected with chlamydia were widely dispersed around the Colorado Springs area,

while those infected with gonorrhea were concentrated in a smaller number of geographic areas. Forty-three percent of the men and 80 percent of the women infected with chlamydia were asymptomatic.

1. H. L. Zimmerman et al., "Epidemiologic Differences Between Chlamydia and Gonorrhea," *American Journal of Public Health*, 80:1338, 1990.

Users Approve of Female Condom

The female condom was found to be more acceptable than the male condom in a small Danish pilot study, with a majority of men and women reporting that it was easy to insert and use and did not interfere with orgasm.¹ Over a three-month period, 20 sexually active couples tested the female condom during 48 acts of intercourse and the male condom during 21 acts of intercourse. About two-thirds of the study participants found the female condom easy to insert, and most of the remainder reported that insertion was acceptable. More than three-quarters said that, in general, they had had no trouble using it. Nearly all of the women reported that their sexual response was not affected, although one-third of their partners said that achieving orgasm was slightly difficult when the female condom was used. However, the same participants were generally less satisfied with the male condom as well, and both men and women were more likely to report problems in achieving orgasm when using the male condom.

1. E. Gregersen and B. Gregersen, "The Female Condom: A Pilot Study of the Acceptability of a New Female Barrier Method," *Acta Obstetrica et Gynecologica Scandinavica*, 69:73, 1990.

Minipill May Have Broader Appeal

The progestogen-only minipill is highly effective and may not disrupt the menstrual cycle as extensively as family planning providers have thought, according to data from two retrospective British studies. Clinic records of 358 nonbreastfeeding women who had obtained the minipill from a British family planning clinic between 1977 and 1979 showed that 324 women used the minipill for at least six months and averaged 55 months of use each, with 46 percent using the minipill for more than four years and 13 percent using it for more than eight years.¹ Twenty-four percent of the women reported nonmenstrual side effects, the most common being breast discomfort, headache, bloating and weight gain. Forty-eight percent of women who discontinued the method (22 percent of all women who used the minipill) at-

tributed their decision to menstrual disturbances, and another 12 percent to side effects. Only three pregnancies were noted in clinic records during the three-year period, leading the researchers to comment that the minipill "should be more widely promoted and used." The second study examined clinic records of 1,042 clinic patients who had ever used the minipill; only 21 pregnancies had been reported, for an overall pregnancy rate of 1.01 failures per 100 woman-years of use.² The researchers conclude that in their experience, "the progestogen-only pill is a suitable and equally effective alternative to the combined pill in all age-groups."

1. M. Broome and K. Fotherby, "Clinical Experience with the Progestogen-Only Pill," *Contraception*, 42:489, 1990.

2. A. M. Bisset, I. Dingwall-Fordyce and M. I. K. Hamilton, "The Efficacy of the Progestogen-Only Pill as a Contraceptive Method," *British Journal of Family Planning*, 16:84, 1990.

A Slimmer Copper T

A modification of the Copper T IUD intended to make the device simpler to load into its inserter and easier to insert may actually have no important insertion advantages over the standard Copper T, according to a recent report, although it is just as effective as the unmodified TCu 380.¹ About 300 women obtaining an IUD from clinics in Brazil, Chile, the Dominican Republic, Egypt and Sweden received the standard TCu 380, while around 700 were given the modified device, called the Slimline. Its major modification is that the copper sleeves on the horizontal arms are flush with the plastic rather than raised, and are situated at either end of the arms rather than in the middle. Providers reported no difference in the ease of loading the Slimline into the inserter tube or of inserting it, and the women reported no difference in the amount of pain experienced during insertion. There was no difference between the two IUDs in 12-month pregnancy rates, and while the Slimline was associated with a slightly higher expulsion rate than was the standard IUD, the difference was not statistically significant. The investigators observe that while "a handful of cases suggest that the Slimline may be easier to insert than the standard model in women with small cervical canals, . . . this study did not demonstrate any clear differences either in ease of insertion or in pain associated with insertion."

1. I. Sivin et al., "A Randomized Trial of the Gyne T380 and Gyne T380 Slimline Intrauterine Copper Devices," *Contraception*, 42:379, 1990.

Six School-Based Clinics: Their Reproductive Health Services and Impact on Sexual Behavior

By Douglas Kirby, Cynthia Waszak and Julie Ziegler

Summary

An evaluation of the reproductive health programs of six diverse school-based clinics measured the impact of the clinics on sexual behavior and contraceptive use. All six clinics served low-income populations; at five of them, the great majority of the students served were black. An analysis of student visits by type of care given found that these clinics were not primarily family planning facilities; rather, they provided reproductive health care as one component of a comprehensive health program.

Student survey data collected in the clinic schools and nearby comparison schools (four sites) or collected both before the clinic opened and two years later (two sites) indicated that the clinics neither hastened the onset of sexual activity nor increased its frequency. The clinics had varying effects on contraceptive use. Providing contraceptives on site was not enough to significantly increase their use; in only one of the three sites that did so were students in the clinic school significantly more likely than students in the comparison school to have used birth control during last intercourse. However, condom use rose sharply at one clinic school that had a strong AIDS education program and was located in a community where AIDS was a salient issue. At another clinic

"In each school, a large majority of students were sexually experienced, and many had engaged in sex before entering high school. Therefore, programs to delay or reduce sexual activity should begin in elementary or junior high school."

school, where pregnancy prevention was a high priority and staff issued vouchers for contraceptives, the use of condoms and pills was significantly higher than in the comparison school. A third clinic school—which focused on high-risk youth, emphasized pregnancy prevention and dispensed birth control pills—recorded a significantly higher use of pills than its comparison school. Although the data suggest that the clinics probably prevented small numbers of pregnancies at some schools, none of the clinics had a statistically significant effect on school-wide pregnancy rates.

Introduction

Since the first school-based health clinic opened in a Dallas high school in 1970, such clinics have been seen not only as a means of providing basic health care to medically underserved teenagers, but as a promising way of addressing some of the intractable and complex health and social problems, particularly unintended pregnancy, that face young people.

Currently, there are more than 178 school-based clinics operating in middle schools and junior and senior high schools in 32 states; they may be found in most major cities and many rural areas.¹ Many of the clients served by these clinics are low-income minority youth with limited access to other sources of health care. School-based clinics provide them with a wide range of medical and counseling services, including primary health care, physical examinations, laboratory tests, diagnosis and treatment of illness and minor injuries, immunizations, gynecological

examinations, birth control information and referral, pregnancy testing and counseling, referral for prenatal care, nutrition education, weight reduction programs and counseling for substance abuse. A few dispense contraceptives, offer on-site prenatal care or provide day care for children of students.

School-based clinics are well used by students in the schools served. On the average, about half the students attending each school enroll for clinic services; that is, they complete a registration form and obtain parental permission to use the clinic. About eight in 10 of those enrolled actually use the clinics' services, and for almost half of those enrolled, school-based clinics are their sole or primary source of health care.²

There has been relatively little research on the clinics' impact on student sexual behavior, partly because most of the increase in school-based clinics has occurred in the last few years. However, a few studies provide some evidence that clinics can have a positive impact in this area. The most widely quoted findings are from a study of school-based clinics in St. Paul, Minnesota.³ The investigators reported substantial proportions of students using the clinics for reproductive health services, remarkably high contraceptive continuation rates and large decreases in birthrates. However, because of data limitations, it is not clear whether a real decline occurred; a more recent study of the St. Paul clinics did not reveal a significant impact on birthrates.⁴

Because public policy on school-based clinics should be based on research from

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more than one site,* the Center for Population Options began an evaluation in 1984 of a diverse group of clinics located in different parts of the United States. The project was designed to assess the students' use of clinic services and the clinics' impact on use of medical services generally. It also sought to determine what effect, if any, the clinics had on school absenteeism, illegal drug use, alcohol consumption, cigarette smoking, sexual activity, pregnancy rates and use of birth control methods. This article focuses on the reproductive health services offered by six school-based clinics and the impact of those services on students' sexual and contraceptive behavior.

The Clinics

When we were selecting study sites in 1984 and 1985, only 17 communities had school-based clinics in operation. The six clinics chosen for evaluation were in different parts of the country, in rural and urban communities and in different political and cultural milieus: Gary, Indiana; San Francisco; Muskegon, Michigan; Jackson, Mississippi; Quincy, Florida; and Dallas. The remaining clinics were excluded because they did not serve large enough proportions of the student population to have a significant impact, because they were participating in other evaluation projects that might conflict with this one, because we could not obtain approval from the school board or because we could not complete the necessary logistical arrangements in time.

By definition, all of the clinics were located on school grounds.† All six served low-income populations with large proportions of minority students (Table 1). In five of the six schools, the great majority of the students were black; in the San Francisco school, on the other hand, fewer than one-third of the students were black and substantial proportions were Hispanic and Asian. Four of the clinics had been open for at least three years when the study began; the oldest of these, the Dallas clinic, had been open for 14 years. The two remaining clinics, those in San Francisco and Quincy, opened after the study began; consequently, the study assessed their first two years of operation.

Every clinic employed at least one part-time or full-time physician and one or more part-time or full-time nurse practitioners. However, staff size varied considerably, from 10 full-time and two part-time staff at the Dallas clinic to 4-6 staff (mostly part-time) at the other sites. The clinics all provided primary health care, contraceptive

Table 1. Characteristics of schools and school-based clinics, by site

Characteristic	Gary	San Francisco	Muskegon	Jackson	Quincy	Dallas
SCHOOL						
Enrollment*	1,700	1,800	800	700	800	1,100
Racial/ethnic composition (%)†						
Black	98	30	94	99	89	76
Hispanic	1	20	1	0	0	21
Filipino	0	37	0	0	0	2
White	0	3	4	0	11	1
Other	1	10	1	1	0	0
Total	100	100	100	100	100	100
CLINIC						
Date opened	1981	1985	1981	1979	1986	1970
Staff						
Physician	2‡	1‡	1‡	1‡	1‡	2§
Nurse practitioner	1	1	2‡	1‡	1	2
Nurse	0	0	0	1‡	0	1
Nurse assistant	0	0	0	0	0	2
Secretary/receptionist	1	1	1‡	0	1	2
Social worker	1	2‡	0	0	1‡	1
Health educator	0	1	1	1‡	0	0
Dentist	0	0	0	0	0	1
Dental hygienist	0	0	0	0	1‡	0
Nutritionist	1	0	0	0	0	0
Family planning services						
AIDS/sexuality education in classroom	No	Yes	Yes	No	No	No
Pregnancy testing/counseling	Yes	Yes	Yes	Yes	Yes	Yes
Contraceptive counseling	Yes	Yes	Yes	Yes	Yes	Yes
Contraceptive prescriptions	No	No	Yes*†	Yes	Yes	Yes
Contraceptive dispensation	No	No	No	Yes	Yes	Yes

*Enrollment at time of study, rounded to nearest 100.

†Based on student health survey data.

‡Part-time. §One full-time, one part-time.

*†Vouchers were issued to obtain contraception at a nearby family planning clinic.

counseling and pregnancy tests, but they differed considerably in the amount of emphasis they placed on reproductive health and in their provision of sexuality education and family planning services.

• *Gary.* The Gary clinic placed more emphasis on providing information and counseling and less emphasis on treating medical problems and writing prescriptions. Increasing the use of birth control methods and preventing pregnancy were not its major goals. The clinic did not bring up the subject of family planning, but if the students did, clinic staff would provide information and counseling, conduct pelvic examinations if appropriate and refer students to other family planning providers. The clinic itself did not prescribe or dispense contraceptives.

• *San Francisco.* The San Francisco clinic gave more emphasis to preventing pregnancy and curtailing the spread of AIDS and other sexually transmitted diseases (STDs). It had well-developed AIDS

education and sexuality education programs; the former included an hour-long classroom presentation by a person with AIDS. The clinic educator gave classroom presentations on sexuality, trained peer

*Another study, published in 1986, reported on a pregnancy prevention program in Baltimore that offered classroom presentations and counseling and arranged for a nearby clinic to provide reproductive health services. Younger students at the two experimental schools were more likely than those in the control schools to use contraceptives, and overall, participants in the experimental program had significantly lower pregnancy rates. (See: L. S. Zabin et al., "Evaluation of a Pregnancy Prevention Program for Urban Teenagers," *Family Planning Perspectives*, 18:119, 1986.)

†The only partial exception is the Quincy clinic. After being located on the school grounds for 18 months, the clinic (which was housed in a trailer) was moved—only about a hundred yards, but technically off the school grounds. However, students could still obtain passes to visit the clinic during the school day. This evaluation covers both the period when it was on the school grounds and the following six months, when it was "off campus." Data collected during the two periods were nearly identical.

counselors and counseled students in the clinic.

Despite its emphasis on reducing STDs and unintended pregnancy, the San Francisco clinic did not prescribe or dispense contraceptives, although it strongly encouraged students to use condoms (and sometimes pills, in addition) if they were having sex. When students asked for contraceptives, clinic staff referred them to other sources. Condoms were readily available in the community, both at drugstores and at a nearby community health clinic.

All of the clinic and school AIDS-prevention activities were strongly reinforced by the larger San Francisco community. San Francisco, which has one of the highest rates of AIDS in the United States, had implemented a variety of media programs and other public health efforts to help reduce the transmission of the human immunodeficiency virus (HIV). Students were exposed to a wide variety of public health messages promoting the use of condoms, including fairly graphic demonstrations of their proper use. Other clinics in the community, both public and private, made it a policy to give condoms to anyone who requested them; there was no requirement to register or complete any forms.

• *Muskegon.* Because of the high pregnancy rate in the Muskegon high school, both the school and the clinic devoted considerable attention to pregnancy prevention. The school health teacher devoted 2-3 weeks of class time to discussion of teenage pregnancy and STDs. In addition, the clinic staff implemented or coordinated a variety of sexuality education programs in the school. The clinic, which was administered by Planned Parenthood, did not prescribe or dispense contraceptives, but its staff provided consultation and education, conducted pelvic examinations and issued vouchers that students could use to obtain birth control pills at the nearby Planned Parenthood clinic. The education and counseling were thorough, but obtaining birth control pills often required four visits. Females could go directly to Planned Parenthood for pills, and males could obtain condoms there or purchase them in many neighborhood drugstores or gas station rest rooms; however, unless students went through the school clinic, they had to pay for services and contraceptives. Most of the high school students had come from a nearby middle school, which had a clinic that provided some education on sexuality and reproductive health.

• *Jackson.* The high school provided little

sex education, but the Jackson clinic appeared to focus more on high-risk students and risk-taking behavior than did some of the other clinics. Sexually active students were identified during a psychosocial assessment completed at each student's first clinic visit. Appointments were promptly made with the nurse practitioner for counseling about abstinence and birth control methods and then with the clinic physician, who dispensed birth control pills and condoms. The clinic had an effective tickler system: If females using birth control pills did not return within two months for additional cycles of pills, they were asked to come to the clinic.

• *Quincy.* Because of high pregnancy rates in the Quincy community, family planning was given considerable emphasis in the school clinic. The clinic staff gave classroom presentations on sexuality, on health in general, and on the clinic and its services. During routine clinic visits, if students gave any indication that they might be having sex, the nurse practitioner asked questions to determine whether they were using contraceptives. If they were not, the nurse practitioner discussed abstinence and family planning methods with them and, if necessary, made appointments with appropriate clinic staff for the students to obtain one of the methods dispensed by the clinic. After the clinic had been in operation about six months, it set up a tickler system to assure that students returned for their family planning appointments. In general, the family planning protocols were thorough, and all students seeking care received it, but there were not enough staff to provide comprehensive care to large numbers of students.

• *Dallas.* The oldest school-based clinic in the country, the Dallas clinic was also the largest in both space and staffing. Unlike the other clinics in this study, it served all 12-18-year-olds, whether or not they attended the high school in which the clinic was located. All entering students were given appointments for a health maintenance examination, which included visits with the physician or nurse practitioner, social worker, screening nurse and dentist. During these visits, staff discussed a wide range of potential medical and psychosocial problems with the students. Issues involving sexuality were discussed at this time and during any other routine visit. Staff counseled students about abstinence and birth control and provided an appropriate method to females who wanted a contraceptive. No follow-up appointments were made and there was no follow-up system, but students were

encouraged to return when they needed additional supplies.

These six clinics differed from one another, and as a group they also differed in two important ways from the current universe of school-based clinics. First, five of the clinics were located in schools in which the majority of the students were black; nationally, school-based clinics serve populations with larger proportions of white students than did the clinics studied here. Second, three of the six clinics dispensed contraceptives, while only 21 percent of school-based clinics across the country currently do so.⁵ These differences must be considered when generalizing the findings reported here to all school-based clinics; the six sites we studied are not representative of current clinics, but they do constitute a heterogeneous group of clinics reflecting the diversity of clinics nationwide.

Methods

To assess the reproductive health services provided by the clinics and to evaluate the impact of those services, we used data from two primary sources: clinic records and a student health survey. Site visits and interviews with staff provided additional information. Each clinic kept records of the number of clinic users, the number of clinic visits, the number and type of family planning visits and, depending on the particular clinic, the number of students given vouchers for contraceptives or the number of students given contraceptives. These were tallied for the 1985-1986 academic year or, when possible, for the 1986-1987 academic year. The student health survey, which provided information on all the students in each school (or samples thereof), included questions about use of the clinic that could be compared to or integrated with the clinic record data as well as questions about sexual activity that could be used to measure the impact of the clinic.

To evaluate the impact of each clinic, we needed some means of comparing student populations in schools with clinics to student populations in schools without clinics. Random assignment to treatment and control conditions (clinic and nonclinic schools) was obviously not possible; therefore, for each of the four clinics that were operating when the project began—Gary, Muskegon, Jackson and Dallas—we identified a comparison school that had similar social and demographic characteristics (e.g., socioeconomic status and race) and was located as close as possible to the clinic school.

Because the other two schools included in the evaluation—San Francisco and Quincy—had not yet opened their clinics when the study began, we were able to collect preclinic baseline data and two-year postclinic data for them. This was not a longitudinal study in which the same students were surveyed both times; rather, the survey data provided a cross-sectional “snapshot” of the student population before the clinic opened and a second snapshot two years later. Some students were undoubtedly included in both samples, but during the two years between surveys, many new students entered the schools and many others graduated or left school for other reasons.

The sampling frame varied from school to school. In most, the sample was selected from the entire student body, but in the Gary and San Francisco schools, which had 1,700 students or more, we selected samples of classes, stratified by grade level and level of instruction.

Procedures for obtaining parental consent for survey participation also varied from school to school. At most schools, parents were notified in writing and given the opportunity to exclude their child's participation (passive consent). Because fewer than five parents in each of the schools at these sites did so, this would not have produced any bias. In San Francisco, consent procedures changed from passive consent for the baseline survey to active consent for the second survey, and various problems (including an immediate deadline) prevented many students from obtaining written consent. In Jackson, a requirement to obtain active parental consent reduced the potential sample in both the clinic and the comparison school; however, the comparability of the samples should not have been compromised, because both schools required the same procedure.

In Gary, Jackson and Dallas, the survey was administered first in one school and then immediately in the other. In Muskegon, the survey was administered in the comparison school about six months after it was administered in the clinic school. Finally, in both San Francisco and Quincy, the two rounds of the survey were administered almost exactly two years apart.

We used a comprehensive health survey designed to measure social and demographic characteristics, clinic use, use of medical services in general, risk-taking behavior, sexual activity, contraceptive use and pregnancy. Different versions of this questionnaire were used at different sites, but all versions contained the same set of

questions on sexual behavior. The initial version focused on sexuality, but was revised during the second year to cover a wider variety of health issues.

The survey questions on sexuality, some of which were taken from previous studies, were pretested with three five-member groups of students for comprehension and clarity of items. To measure the test-retest reliability of the survey, we administered it twice, two weeks apart, to one group of 87 students. The test-retest coefficients of agreement and the correlation coefficients indicated that the items had adequate reliability.⁶

There is reason to believe that the data on sexual activity and use of birth control are also valid. First, the survey data on sexual behavior and contraceptive use were consistent with previously published findings from similar studies.⁷ Second, survey data on use of the clinic for contraceptives were consistent with clinic data. However, pregnancy data should be interpreted cautiously. Some students may not wish to report a previous pregnancy (particularly if it ended in abortion), and a few teenagers may define a previous pregnancy as such only if it resulted in a live birth. In addition, some teenagers who conceived while in high school subsequently dropped out and were not present to complete a questionnaire. Nevertheless, there is no reason to expect reporting biases to have a stronger effect on results from either the clinic school or the comparison school, except possibly in Jackson, where a day-care program may have increased the proportion of teenage mothers who remained in school.

The proportion of each school's total student enrollment that completed the questionnaire varied from 24 percent to 90 percent. The response rates were reduced by intentional sampling of students in Gary and San Francisco, the need to obtain active parental consent in Jackson and San Francisco, inflated enrollment figures that retained names of dropouts at some of the sites, high rates of absenteeism at most of the sites and the exclusion of educable mentally disabled students who may not have been able to complete the questionnaire reliably. The response rates, based on the number of students who actually attended class the day of the survey and who had parental permission to participate, ranged from 90 percent to 98 percent, and the survey data should be representative of these students.

Although the comparison schools in Gary, Muskegon, Jackson and Dallas were selected to resemble the clinic schools as

closely as possible, the schools being compared differed in some social and demographic characteristics. Likewise, in San Francisco and Quincy, there were some differences between the baseline and two-year samples. Therefore, for the outcome data reported in this article, we modified the samples to make the background characteristics of the clinic and nonclinic samples more similar. First, in the five sites that had very large percentages of black students (all sites except San Francisco), all nonblack students were omitted from the analysis; this made the racial composition of the clinic and nonclinic samples identical and eliminated any possible interaction effects between race and outcome variables. Second, in San Francisco, the two-year posttest sample was weighted so that its racial composition was equivalent to that of the baseline sample. After these two modifications were made, the clinic-school and comparison-school samples did not differ significantly on a majority of the background characteristics. Where differences did exist, they suggested that the students in the comparison schools were slightly more advantaged than the students in the clinic schools.*

We used multiple regression techniques to control for any impact these remaining differences might have on outcome variables. The regression coefficients reported in the tables measure the relationship between being in a clinic school and various outcome variables, statistically controlling for the following background characteristics: age, number of parents in the home, receipt of food stamps, receipt of free

*There were statistically significant differences between the clinic and comparison samples on 27 of 66 characteristics. In Jackson, the proportion of females in the clinic sample was significantly higher than in the comparison sample (61 percent vs. 52 percent). In Muskegon, Jackson and Dallas, the students in the clinic schools were significantly older than the students in the comparison schools (mean difference, 2-3 months); they were less likely to have two parents in the home and were more likely to receive income from welfare and social security and to receive free lunches and food stamps. In Gary and Jackson, students in the comparison schools had higher grade-point averages, but the absolute differences were very small (0.1 on the traditional 4.0 scale). In Muskegon and Dallas, students in the comparison schools were more likely to report a desire to continue their education beyond high school (66 percent vs. 55 percent and 46 percent vs. 40 percent, respectively). In San Francisco, during the two years between the surveys, the proportion of students in homes receiving food stamps decreased from 11 percent to eight percent. During the equivalent period between surveys, Quincy's economy improved, possibly explaining the significant decreases in the proportions of families receiving food stamps and free lunches (by seven percentage points and 13 percentage points, respectively).

Table 2. Total number of clinic visits and percentage made for reproductive health care, by type of care, according to site

Visits and type of care	Gary	San Francisco	Muskegon	Jackson	Quincy	Dallas
Total visits (N)	2,791	2,357	1,859	3,341	4,399	4,489*
Visits for reproductive health care (%)	15	9	27	37	30	38
Contraceptive counseling, prescription and/or dispensation	8	4	25	28	24	14
Pregnancy test	2	2	2	3	na	8
Prenatal care	na	na	na	2	3	3
STD testing	4	1	na	na	na	1
General gynecology	1	2	na	4	3	12

Note: Based on clinic records; na=not applicable.

*Visits from students at clinic school; another 6,000 visits were from other adolescents.

lunches, grade point average and academic plans.*

The communities in which the schools were located might also have varied in ways that would have different effects on the clinic and comparison schools. In Gary, Jackson and Dallas, the clinic schools and their respective comparison schools were reasonably close to one another and there were no known programs that would have had a major impact on the students.

In Quincy, before the school-based clinic opened, students received passes from the school to attend a nearby public health clinic that provided reproductive care. When that clinic moved several miles away, students could no longer attend it, and the public health department opened the school clinic. Thus, in Quincy, this study measures the differences between the impact of services provided at the school and that of services the students had previously received at the public health clinic.

At two other sites, the issue of possible confounding factors was more complex. In San Francisco, the community changed dramatically during the two years covered by the evaluation. AIDS became a far more salient issue, and the community implemented numerous programs to help reduce HIV transmission. Moreover, condom use increased substantially among adolescents nationwide during this time,⁸ and we would expect this increase to be greatest in areas where AIDS was a prominent public health issue. The comparison school for the Muskegon site was 90 miles

away, and it is difficult to know in what ways the communities might have differed. Moreover, the comparison school had a strong sex education program that may have affected contraceptive use. Finally, the Muskegon surveys were administered at the clinic and nonclinic schools at two different times of the year—in the spring and fall, respectively. Therefore, in these two communities, it is more difficult to attribute differences between the clinic school and the comparison (or preclinic) school to the school clinics.

Services Provided

These school-based clinics were comprehensive clinics designed to provide a variety of needed health services to adolescents. Both clinic records and survey data confirmed that the clinics provided health care to many students: In five sites, at least 60 percent of the students had used the clinic, and in Dallas, 83 percent of the students had done so. Only in the San Francisco school had fewer than half (48 percent) of the students ever used the clinic, which had been open only two years. Furthermore, in four sites, at least 63 percent of the students had used the clinic during the preceding year. At four of the sites, students made 2,400–4,400 visits per year. In Muskegon, however, there were only 1,859 visits to the clinic, while in Dallas, which had 4,489 student visits, there were 6,000 more visits by adolescents who did not attend the clinic school. Of those students who used the clinic, about half visited it one or two times per year.

As discussed previously, the clinics varied in the extent to which they addressed reproductive health. This is demonstrated by the proportion of all visits to the clinic that were for reproductive services and in the proportion of all students in the school who used the clinic for such services. Of

all the visits, 9–38 percent were for reproductive health in general; the proportions of visits specifically for family planning were much smaller and reflected the types of services available (Table 2). In the Gary and San Francisco clinics, which did not prescribe or dispense contraceptives, eight percent and four percent of the visits, respectively, were for counseling and referral; in Muskegon (which provided counseling, vouchers for contraceptives, and referral), the proportion was 25 percent. In the Jackson, Quincy and Dallas clinics, which provided counseling and dispensed contraceptives, the proportions ranged from 14 percent to 28 percent. These figures indicate that family planning was an important component of the clinics that provided vouchers for or dispensed contraceptives.

The proportions of students using the clinics for contraceptive services also varied greatly according to the services available. In Gary and San Francisco, which did not dispense contraceptives, only five percent and three percent of the students, respectively, used the clinic for contraceptive counseling (data not shown). In contrast, 21 percent of the Muskegon students used the clinic for contraceptive counseling and 17 percent obtained contraceptive vouchers from the clinic; in Jackson, Quincy and Dallas, the proportion of students who obtained contraceptives from the clinic ranged between 22 percent and 26 percent.

In the four schools that provided contraceptives (or vouchers), the proportion of sexually experienced female students who obtained contraceptives through the clinics varied from 23 percent (N=67) in Muskegon to 40 percent (N=182) in Dallas. The proportion of sexually experienced males in those schools who obtained condoms from the clinics ranged from 12 percent (N=41) in Muskegon to 18 percent (N=93) in Quincy. The proportions for males are lower than those for females, probably because condoms could be obtained without a doctor's prescription and because efforts to increase use of contraceptives focused on females.

These percentages should be viewed cautiously. Although the numerator includes all students who ever used the clinic to obtain contraceptives, some may have used the clinic only a few times, and probably only a small proportion received continuous contraceptive coverage through the clinic. Therefore, the numerator may overestimate coverage of the students. On the other hand, the denominator includes all sexually experienced students, even

*Using three criteria—factor loadings, skewedness of each distribution, and relative reliability and validity—we conducted a factor analysis to reduce a list of 12 variables to this group of six. Further regression analyses indicated that after we controlled for these six characteristics, additional variables did not significantly increase the amount of variance explained.

those who had sex only once and did not subsequently need contraceptives; consequently, the resulting percentage may underestimate the clinics' coverage of sexually active students.

An analysis of clinic records indicated that a substantial proportion of female students who obtained birth control pills either did not return to the clinic for prescriptions for subsequent cycles of pills or did not return in time to allow continuous contraceptive coverage for six months or more. They may have stopped having sex, graduated or left school for other reasons, obtained contraceptives elsewhere or simply had unprotected sex. In any case, substantial proportions of young women did not obtain cycles of pills from the clinics often enough to allow continuous coverage.

Sexual Activity

The data from the student health survey was used to assess the impact of the school-based clinics on sexual activity among students at those schools. Three questions concerned sexual activity: "Have you ever had sex?" and, if so, "How old were you when you first had sex?" and "How many times have you had sex within the past four weeks?" The resulting data were first analyzed using chi-square or t-tests (Table 3); then multiple regression was used to control for the respondents' background characteristics (Table 4, page 12). The analyses of age at first intercourse and frequency of intercourse were limited to sexually experienced students.

- *Ever had sex.* When chi-square analysis was used to compare the proportions of students at the clinic schools and the matched nonclinic schools who had ever had sex, there were no significant differences among either males or females at five sites, but an analysis of post data for the San Francisco clinic revealed that females (but not males) were significantly more likely to have had sex than they had been before the clinic opened ($p<.05$). In Dallas, males at the clinic school were less likely to have had sex, but the difference fell just short of significance ($p=.06$).

The regression results were somewhat different. At three of the sites, there were no significant differences between the clinic and nonclinic schools in the proportion of males or females who had ever had sex. However, in San Francisco, the difference among females found in the chi-square analysis remained significant ($p<.05$). In Muskegon, a significantly smaller proportion of female students in the clinic school than in the comparison

Table 3. Measures of sexual activity among high school students, by gender, according to site and presence of clinic

Measure and gender	Gary		San Francisco		Muskegon		Jackson		Quincy		Dallas	
	Non-clinic	Clinic	Pre-clinic	Post-clinic	Non-clinic	Clinic	Non-clinic	Clinic	Pre-clinic	Post-clinic	Non-clinic	Clinic
Ever had sex												
Males												
N	294	274	426	204	432	183	242	119	315	235	432	175
%	87	82	63	58	93	91	93	96	92	91	92	87
Females												
N	341	386	420	226	497	248	273	190	283	352	449	218
%	60	63	37	46*	72	69	75	82	82	82	76	80
Age at first intercourse†												
Males												
N	251	220	238	115	u	u	218	110	286	206	379	148
Mean	12.7	12.5	13.3	13.3	u	u	11.5	12.0	11.7	11.9	11.4	12.4**
Females												
N	201	238	145	101	u	u	196	153	230	285	334	168
Mean	14.8	14.4	15.0	14.8	u	u	14.3	14.8**	14.3	14.3	14.4	14.4
Frequency of sex in last 4 weeks†												
Males												
N	246	222	247	110	382	156	221	109	272	202	375	137
Mean	2.8	2.6	2.9	2.4	4.2	3.7	3.7	3.6	3.3	3.8	3.2	3.2
Females												
N	197	239	151	98	346	166	196	148	223	280	316	164
Mean	1.8	2.1	3.3	2.1	2.6	2.5	2.8	2.2	2.5	2.9	2.2	2.5

*Difference significant at $p<.05$, as determined by χ^2 test.

**Difference significant at $p<.01$, as determined by t-test.

†In this and subsequent tables, analysis restricted to sexually active students.

Notes: To control for race, the results in tables 4–9 for all sites except San Francisco are based on blacks only. For San Francisco, the postclinic data are weighted to equal the racial distribution of the preclinic sample; u=unavailable.

school had ever had sex ($p<.05$). And in Dallas, with respondents' background characteristics controlled, the difference between males at the clinic school and those at the comparison school became significant ($p<.01$).

- *Age at first sex.* When t-tests were used to compare mean age at first intercourse, two sites had significant differences. In Jackson, females at the clinic school were slightly older at first intercourse than those at the comparison school (14.8 years vs. 14.3 years; $p<.01$). Males in the clinic school in Dallas were one year older at first intercourse than males at the comparison school (12.4 years vs. 11.4 years; $p<.01$); as Table 4 shows, this difference remained significant when background characteristics were controlled ($p<.001$).

The mean age at first intercourse at these sites indicates that many of the students surveyed were sexually experienced before entering high school. Because it is improbable that the school-based clinics affected the sexual activity of students before they attended the clinic schools, we performed an additional analysis that excluded students who were sexually experienced

before entering high school and that merged the male and female samples (to increase the sample size). Regression analyses (not shown) indicated no differences between the clinic and nonclinic schools in the proportions of students who had become sexually experienced after entering high school.

- *Frequency of sex.* Neither t-tests nor multiple regression found significant differences between the clinic school and the comparison school at any site in the frequency of sexual activity during the four weeks before the survey.

Contraceptive Use

We evaluated the impact of the clinics on the students' use of contraceptives by asking those who were sexually experienced whether they or their partner had used any method at last intercourse (including rhythm or withdrawal), and more specifically, whether they had used condoms or pills. The results were analyzed first through chi-square tests (Table 5, page 12) and then through multiple regression to control for background characteristics (Table 6, page 13).

Table 4. Unstandardized regression coefficients, by measure of sexual activity and gender, according to site

Measure and gender	Gary	San Francisco	Muskegon	Jackson	Quincy	Dallas
Ever had sex						
Males						
N	558	589	596	353	538	595
Coefficient	-.05	-.08	-.02	.01	-.00	-.07**
Females						
N	720	615	729	458	624	658
Coefficient	.04	.11*	-.08*	.04	.01	.03
Age at first intercourse						
Males						
N	464	332	u	321	481	521
Coefficient	-.25	.09	u	.50	.05	.95***
Females						
N	435	230	u	345	505	498
Coefficient	.09	-.01	u	.32	.13	.03
Frequency of sex in last 4 weeks						
Males						
N	461	332	521	322	463	507
Coefficient	-.16	-.79	-.42	-.56	.22	.08
Females						
N	432	234	500	340	495	476
Coefficient	.35	-.99	-.32	-.68	.21	.03

*Difference between clinic and nonclinic school significant at $p < .05$, as determined by "change in F " test.**Difference between clinic and nonclinic school significant at $p < .01$, as determined by "change in F " test.***Difference between clinic and nonclinic school significant at $p < .001$, as determined by "change in F " test.

• *Any method.* Neither analysis found significant differences between the clinic school and the matched nonclinic (or pre-clinic) school in Gary, San Francisco, Jackson or Quincy. However, chi-square

tests revealed that in Muskegon, males and females in the clinic school were significantly more likely to have used a method the last time they had sex than were those in the comparison school ($p < .001$). In Dal-

las, females in the clinic school were significantly less likely than females in the comparison school to have used a method the last time they had sex ($p < .05$). This resulted primarily from more use of rhythm and withdrawal by students at the comparison school (data not shown). Multiple regression produced the same results.

• *Condoms.* Neither analysis found significant differences at Gary, Jackson, Quincy or Dallas. However, chi-square analysis revealed significant differences at two sites. In San Francisco, the proportions of males and females in the postclinic sample who reported condom use were significantly higher than the proportions among their preclinic counterparts. The proportion of males who reported having used condoms at last intercourse increased from 29 percent to 56 percent ($p < .001$), and the proportion of females who reported that their partners had used condoms at last intercourse rose from 22 percent to 38 percent ($p < .001$). In Muskegon, the proportion of males who reported using condoms was significantly larger at the clinic school than at the comparison school (61 percent vs. 41 percent; $p < .001$).

Multiple regression revealed similar differences at those sites. In San Francisco, the differences between the preclinic and postclinic samples remained significant among both males and females ($p < .001$ and $p < .01$, respectively). In Muskegon, both males and females at the clinic school were significantly more likely than their counterparts at the comparison school to have used condoms at last intercourse ($p < .001$ and $p < .05$, respectively).

• *The pill.* The data from San Francisco, Gary, Quincy and Dallas revealed no measurable differences between the clinic and nonclinic (or preclinic) schools. Moreover, chi-square tests found no significant difference at any site in the proportion of males reporting that their partners used the pill. However, the proportion of females who reported using the pill at last intercourse was higher in the clinic school than in the nonclinic school in Muskegon (36 percent vs. 27 percent; $p < .05$) and in Jackson (46 percent vs. 30 percent; $p < .01$).

The regression results were somewhat different. The difference in pill use among females remained significant in Jackson ($p < .05$), but not in Muskegon. However, in Dallas, the proportion of males who reported that their partner was using the pill at last intercourse was significantly lower in the clinic school than in the comparison school ($p < .05$).

• *Clinic users and nonusers.* Comparisons also were made between clinic users and

Table 5. Measures of contraceptive use at last intercourse among high school students, by gender, according to site and presence of clinic

Measure and gender	Gary		San Francisco		Muskegon		Jackson		Quincy		Dallas	
	Non-clinic	Clinic	Pre-clinic	Post-clinic	Non-clinic	Clinic	Non-clinic	Clinic	Pre-clinic	Post-clinic	Non-clinic	Clinic
Used any method												
Males												
N	242	221	256	117	387	165	222	113	210	287	389	144
%	69	65	65	74	61	78***	58	60	70	73	68	76
Females												
N	202	239	150	104	358	168	199	153	230	287	333	169
%	61	68	67	75	60	75***	61	70	74	81	74	63*
Used condom†												
Males												
N	242	221	256	117	387	165	222	110	210	287	389	144
%	52	48	29	56***	41	61***	39	40	57	53	33	36
Females												
N	202	240	150	104	358	168	199	153	230	287	333	169
%	27	31	22	38***	22	29	25	20	46	48	18	16
Used the pill†												
Males												
N	242	221	257	117	387	165	222	110	210	287	389	144
%	10	12	17	24	10	10	18	15	23	28	15	9
Females												
N	202	240	157	104	358	168	199	153	230	287	333	169
%	23	30	18	25	27	36*	30	46**	29	36	32	30

*Difference significant at $p < .05$, as determined by χ^2 test.**Difference significant at $p < .01$, as determined by χ^2 test.***Difference significant at $p < .001$, as determined by χ^2 test.

†In this and Table 6, condom use reported by females and pill use reported by males refer to use by their partners.

nonusers in the clinic schools in Jackson, Dallas and Quincy (data not shown). At all three sites, students who used the clinic for contraceptives were significantly more likely to have used condoms or pills the last time they had sex than were students who did not use the clinic for contraceptives. Nevertheless, at all three sites, substantial proportions of students who had not made a clinic visit for contraceptives used condoms or pills.

In Jackson, 77 percent of the students who had ever used the clinic to obtain contraceptives used condoms or pills at last intercourse, compared with 48 percent of the students who had not done so. In Quincy, these proportions were 76 percent and 61 percent, while in Dallas they were 67 percent and 32 percent, respectively. Regression analysis confirmed the significance of these findings.

These results should be interpreted with caution, as they are undoubtedly biased by self-selection. The students visiting the clinic for contraceptives were likely to be highly motivated individuals who would have used a method even if they had to go elsewhere to obtain it.

• *Alternative sources of contraceptives.* Our findings have shown that at sites where contraceptives were prescribed or dispensed, substantial proportions of sexually experienced students used the clinics for contraceptives and that students who used the clinics for contraceptives were significantly more likely to have used condoms or pills the last time they had sex than were students who did not use the clinics for family planning. This raises the question: Why didn't those clinics demonstrate a larger impact on the contraceptive behavior of sexually experienced students in their respective schools?

The results of another analysis indicate that the primary reason the clinics did not demonstrate a stronger and more consistent impact on contraceptive use lies in provider substitution (Table 7, page 14). In Muskegon, Jackson and Dallas, sizable proportions of students attending the comparison schools (which did not have clinics that prescribed or dispensed contraceptives) used contraceptives when they had sex, but they were more likely than students in the clinic schools to obtain contraceptives from a community family planning clinic or drugstore.

And in Quincy, there was a dramatic drop (from 35 percent to seven percent) in the proportion of sexually experienced students who obtained contraceptives from the health department after the school clinic opened. During the first year after

Table 6. Unstandardized regression coefficients, by contraceptive use at last intercourse and gender, according to site

Contraceptive use and gender	Gary	San Francisco	Muskegon	Jackson	Quincy	Dallas
Used any method						
Males						
N	456	346	534	327	485	527
Coefficient	-.04	.08	.18***	.05	.00	-.08
Females						
N	437	237	513	348	505	498
Coefficient	.06	.07	.16***	.07	.02	-.10*
Used condom						
Males						
N	458	346	534	314	486	527
Coefficient	-.04	.27***	.20***	.06	-.03	.05
Females						
N	439	237	514	350	505	498
Coefficient	.05	.16**	.10*	-.04	.01	-.00
Used the pill						
Males						
N	458	346	534	314	486	527
Coefficient	.02	.04	.00	-.03	.01	-.07*
Females						
N	439	237	513	345	505	498
Coefficient	.04	.07	.08	.13*	.03	-.05

*Difference between clinic and nonclinic school significant at $p < .05$, as determined by "change in F " test.

**Difference between clinic and nonclinic school significant at $p < .01$, as determined by "change in F " test.

***Difference between clinic and nonclinic school significant at $p < .001$, as determined by "change in F " test.

the opening of the school clinic, health department records showed a loss of about 100 female clients, and the school clinic served about 100 more female students. Although these probably were not exactly the same 100 females, the results indicate that the school clinic did absorb health department clients who were students and are consistent with the survey findings reported above.*

To further investigate this substitution effect, we asked students at the clinic schools in Muskegon, Jackson and Dallas where they would go to get contraceptives if there were no school clinic. At those sites, 78–85 percent of the students said they would find another source (another clinic, a doctor or the drugstore), 6–13 percent said they would have sex without using a contraceptive and 4–5 percent said they would refrain from sexual intercourse if there were no clinic at school. Males at all three sites were more likely than females to plan to have sex without using a contraceptive (not shown).

• *Reasons for not using contraceptives.* The failure of some clinics to increase the use of contraceptives among students is also partly explained by an analysis of the reasons why students have sex without using birth control. Sexually experienced students at four sites—Gary, San Francisco, Jackson and Dallas—were asked if they had ever had intercourse without using a

contraceptive method and, if so, why. They were asked to check all listed reasons that might apply. Students in the clinic schools were not significantly less likely to check any of the potential reasons for not using birth control than were students in the comparison (or preclinic) schools. That is, clinic presence did not appear to reduce the importance of any of the reasons.

The two most commonly identified reasons were "Didn't expect to have sex" and "Just didn't think pregnancy would occur." Most of the reasons were not related to access to contraceptives, but to the fact that sex was not anticipated, to perceptions of low risk of pregnancy or to questions of motivation. Others were related to lack of knowledge, to fear of contraceptives or of parents' reactions, or to a desire

*Additional information from the Quincy sample in the postclinic survey indicated that sexually experienced students who usually obtained their contraceptives from the school clinic were not more likely to have used birth control the last time they had sex than were those who usually obtained their contraceptives from the drug store, a doctor or the health department. However, of those who obtained contraceptives from these institutional sources, 81–86 percent had used some type of birth control at last intercourse, compared with 51 percent of those who said they obtained contraceptives from other sources, primarily friends. Students who rely on their friends for contraceptives may be at an earlier stage in their sexual and contraceptive careers and may not have established patterns of obtaining contraceptives themselves.

Table 7. Percentages of sexually active students, by source of contraceptives used at last intercourse, according to site and presence of clinic

Source	Gary		San Francisco		Muskegon		Jackson		Quincy		Dallas	
	Non-clinic (N=432)	Clinic (N=443)	Pre-clinic (N=384)	Post-clinic (N=207)	Non-clinic (N=663)	Clinic (N=333)	Non-clinic (N=422)	Clinic (N=259)	Pre-clinic (N=709)	Post-clinic (N=552)	Non-clinic (N=709)	Clinic (N=306)
School clinic	na	na	na	na	na	17*	na	30	na	34	na	30
Family planning clinic	14	18	7	7	20	13	15	10	†	†	18	5
Doctor	5	9	†	†	5	10	7	5	†	†	†	†
Health department	†	†	†	†	†	†	†	†	35	7	†	†
Hospital clinic	1	1	4	9	3	3	5	1	†	†	4	1
Drugstore	32	26	18	27	12	9	19	9	15	15	12	5
Friend/relative	6	7	6	10	10	15	9	8	9	6	11	2
Other	1	2	2	1	1	2	1	1	3	2	1	2
Not applicable (used withdrawal or rhythm)	5	2	21	10	10	7	3	1	7	10	19	13
Used no method	36	35	36	26	39	24	41	35	28	24	30	39

*Received vouchers that were redeemed at local family planning clinic.

†Information not collected at these locations.

Note: na=not applicable.

not to reduce pleasure. There was no indication from these answers that sexually experienced students from the clinic schools were more knowledgeable about pregnancy prevention or more comfortable with contraceptive use than students in the comparison schools.

Pregnancy

Students at all six sites were asked whether they had ever been pregnant or caused a pregnancy and whether they had been pregnant or caused a pregnancy within the last 12 months. The first question measures the impact of the clinic on all years a student spent at the clinic school and counts pregnancies among females who gave birth and returned to school, while the question about pregnancy during the last 12 months is more likely to eliminate any pregnancy that may have occurred before a student attended the clinic school.

Clinic presence was not associated with lower rates of pregnancy at any of the sites, either during the previous 12 months or at any other time (Table 8). In Dallas, the proportion of females who reported they had ever been pregnant was higher at the clinic school than at the comparison school. However, this difference was not significant when background variables were controlled (not shown).

• *Timing of pregnancies and clinic use.* At most sites, the student health survey asked students who had ever been pregnant (or caused a pregnancy) if they had ever used the school clinic, discussed contraception with clinic staff or received contraceptives from the clinic before their pregnancy.

As Table 9 (page 16) shows, 44–90 per-

cent of the students who had become pregnant or had caused a pregnancy had done so before those students had ever attended the clinic. The Dallas clinic had the largest proportions—48 percent of the males and 56 percent of the females—of students who had been to the clinic prior to conception, possibly because the clinic gave routine maintenance examinations to all incoming students. Even so, almost half of the students who had become pregnant or had caused a pregnancy had done so before they visited the clinic. Some of the pregnancies may have occurred before those students attended the clinic school, but this cannot be determined from the data.

Of the students who had become pregnant or had caused a pregnancy, 62–89 percent had done so before receiving contraceptive counseling from clinic staff, and 68–82 percent of the pregnancies had occurred before the students obtained contraceptives from the clinic. Overall, about one-quarter of the pregnancies occurred after the students had obtained contraceptives from the clinic.

Discussion and Recommendations

These school-based clinics were not primarily family planning clinics, but were comprehensive health clinics that provided primary care and varying degrees of family planning services. Reproductive health accounted for a minority of student visits, but was an important component of clinic services. Clinics that prescribed or dispensed contraceptives served far more students than those that provided only counseling, and the three that dispensed contraceptives on-campus served higher

proportions of sexually experienced females than the one that provided vouchers. Finally, the clinics provided contraceptives to much larger proportions of females than of males.

Much of the debate over school-based clinics has focused on whether contraceptive counseling and provision hasten the initiation or increase the frequency of sexual activity. Our results indicate that this is not the case: At most sites, there were no significant differences between clinic and nonclinic schools; when significant differences did occur, most commonly the data showed less sexual activity among students attending the clinic school.

An examination of each clinic's services provides an interesting perspective on the differential impact of the clinics on use of birth control. The Gary clinic school, which had no measurable effect on contraceptive use, did not emphasize pregnancy prevention, did not prescribe or dispense family planning methods and saw few students for contraceptive counseling or referral.

At the San Francisco school, however, condom use (but not pill use) increased significantly over time. In that school, the clinic developed a strong AIDS education program and a peer education program and encouraged condom use. Nevertheless, the clinic could neither prescribe nor dispense contraceptives, and few students used it for counseling or referral. During the two years between the pretest and the posttest, AIDS became a salient issue throughout San Francisco, and students were exposed to a wide variety of public health campaigns promoting condom use; during the same period, condom use in-

creased substantially among adolescents nationwide.⁹ It is probable that some combination of clinic, school and community interventions contributed to increased condom use, but it is impossible to determine which of these had the greatest impact on the students' behavior.

Muskegon was the only site at which there were significant differences between the clinic school and the comparison school on all three measures of contraceptive use. This clinic, the only one administered by Planned Parenthood, gave considerable emphasis to preventing pregnancy. In the classroom, the health education teacher and clinic staff gave presentations on human sexuality, while in the clinic, staff gave individual consultation on family planning and reproductive health and provided vouchers so that students could obtain pills and condoms without charge at a local family planning clinic.

However, it is not clear why contraceptive use was higher at the clinic school than at the comparison school. Both schools had a strong sex education program, so the effect of this factor is questionable. Moreover, few females and only about 12 percent of the sexually experienced males at the clinic school used the clinic to obtain condoms, calling into question whether the vouchers provided by the clinic produced the large difference in condom use. Finally, there were two methodological limitations: The distance between the two schools was large (90 miles), and the survey was not given at the same time of year at both schools.

Of all the clinic schools, Jackson had the highest proportion (46 percent) of sexually

active female students who had used the pill at last intercourse. Moreover, that proportion was more than 50 percent higher than the figure at the comparison school. It is likely that the clinic program contributed to these differences. The clinic placed little emphasis on condoms, but it administered risk assessments to students who came to the clinic, followed up students who were engaging in unprotected sex, dispensed the pill on site and followed up females who received it. It had the largest proportion of visits made for family planning and the second largest proportion of sexually experienced females receiving contraceptives from the school clinic.

At Quincy, the proportion of females using pills the last time they had sex rose by seven percentage points in the two years after the clinic opened, but that increase was not statistically significant. At first consideration, this finding is disappointing, because the Quincy clinic gave considerable emphasis to pregnancy prevention and the school itself provided sexuality education both before and after the clinic opened. In the clinic, staff asked students about unprotected sexual activity, dispensed contraceptives and contacted students who missed family planning appointments.

Two factors probably explain why the clinic did not have a greater impact on contraceptive use. First, before the clinic opened, students already had access to family planning services through the nearby health department clinic. Second, during its first two years, the clinic had few staff and considerable turnover, which limited its outreach efforts and

the number of students it could serve.

At the Dallas clinic school, approximately 40 percent of the sexually experienced female students received the pill through the clinic; nevertheless, they were not significantly more likely to have used the pill at last intercourse than their counterparts at the comparison school. The reasons for this are not clear; however, this clinic differed from the more successful clinics in two major ways. Although the clinic provided health care to many students, it did not focus on pregnancy prevention. Staff did not make follow-up appointments when they dispensed the pill, and did not check on patients when their cycles of pills would have run out.

In sum, simply providing contraceptives was not enough to significantly increase their use. School and community programs may have increased condom use in at least one site, and a combination of education, counseling, contraceptive provision and careful follow-up may have increased pill use in at least two schools.

Our data did not provide evidence that the presence of any of the school-based clinics reduced the school-wide pregnancy rate. These findings are consistent with the findings on use of birth control methods at sites where there were no significant differences in use of birth control, but they are disappointing in San Francisco, Muskegon and Jackson, where there were such differences. However, in San Francisco and Jackson, this may be explained in part by the fact that the significant differences were in use of specific methods rather than in use of any method of birth control.

Possible validity problems associated

Table 8. Percentages of sexually active high school students who caused a pregnancy or experienced one, by gender, according to site and presence of clinic

Measure	Gary		San Francisco		Muskegon		Jackson		Quincy		Dallas	
	Non-clinic	Clinic	Pre-clinic	Post-clinic	Non-clinic	Clinic	Non-clinic	Clinic	Pre-clinic	Post-clinic	Non-clinic	Clinic
Males												
Ever caused pregnancy												
N	238	216	248	110	363	163	221	112	209	271	354	117
%	14	17	16	12	13	12	12	18	11	7	18	11
Caused pregnancy in last 12 months												
N	227	207	232	110	401	167	196	104	209	276	335	116
%	7	10	10	8	8	8	6	11	7	6	7	10
Females												
Ever pregnant												
N	201	240	149	102	354	168	204	154	229	285	318	169
%	27	21	24	26	20	24	21	25	15	15	18	27*
Pregnant in last 12 months												
N	196	235	147	101	360	172	196	151	228	280	315	169
%	20	11	16	16	14	15	12	14	10	8	10	14

*Significant at $p < .05$, as determined by χ^2 tests.

Table 9. Percentages of students at clinic schools who were ever pregnant (or caused a pregnancy), by timing in relation to clinic use, according to site and gender

Timing of pregnancy	Gary		San Francisco		Muskegon		Jackson		Quincy		Dallas	
	Female (N=53)	Male (N=32)	Female (N=20)	Male (N=10)	Female (N=40)	Male (N=21)	Female (N=39)	Male (N=19)	Female (N=45)	Male (N=19)	Female (N=48)	Male (N=21)
Before using clinic for any reason	77	81	90	80	70	62	64	68	u	u	44	52
Before discussing birth control in the clinic	89	84	80	80	65	81	77	74	u	u	62	67
Before receiving prescription/voucher for contraceptives from clinic	na	na	na	na	77	90	79	na	na	na	na	na
Before obtaining contraceptives from the clinic	na	na	na	na	na	na	82	68	76	79	77	76

Notes: Data are from student health survey and include all students who were ever pregnant or caused a pregnancy regardless of race; na=not applicable; u=unavailable.

with self-report of pregnancy and possible dropouts because of pregnancy may have obscured some clinic impact on pregnancy rates. Furthermore, although many of the students who obtained contraceptives from the clinics might have obtained them from some other source if the clinic had not provided them, not all of them would have done so. Thus, the four clinics that provided contraceptives or vouchers probably helped prevent small numbers of pregnancies, although this effect was not large enough to significantly affect school-wide pregnancy rates.

The clinic and survey data discussed above suggest strategies for improving the effectiveness of school-based clinics. These include:

- *Give a high priority to pregnancy prevention and AIDS prevention.* This may be the most important recommendation. The only clinics that seemed to have affected the use of pills and condoms gave pregnancy prevention or AIDS prevention a very high priority.
- *Conduct more outreach in the school.* The reasons students gave for not using contraceptives included lack of knowledge and skills, and many students became pregnant or caused a pregnancy before visiting the school clinic. Furthermore, two of the apparently effective clinics had developed strong educational and outreach programs in their schools to provide teens with information, skills and motivation that may have helped them make better sexual and contraceptive decisions.
- *Develop programs to delay and reduce sexual activity.* In each school, a large majority of the students were sexually experienced, and many had engaged in sex before entering high school. Therefore, programs to delay or reduce sexual activity should begin in elementary and junior high school. However, because many students had not

yet had sex when they entered high school and many sexually experienced students had sex infrequently, such programs may also be useful in high school. At two sites, there was some evidence that counseling or other programs might have delayed initiation of intercourse.

- *Identify and target students engaged in sexual activity.* Many sexually experienced students did not use the clinic for contraceptives, and many others became pregnant before doing so. Although the clinics generally were effective in treating and counseling students who sought specific services, they must seek out students at risk who are not already motivated to visit the clinics if they are to have a significant impact on sexual risk-taking behavior. Clinic staff should ask students about sexual risk-taking behavior whenever appropriate during clinic visits.

- *Make contraceptives available through the clinics.* The clinics that prescribed or dispensed contraceptives served far more students than those that provided only counseling, and the three clinics that dispensed contraceptives served higher proportions of sexually experienced females than the one that provided vouchers for students to get contraceptives elsewhere.

- *Conduct effective follow-up procedures.* Many females who obtained oral contraceptives from clinics stopped getting them within six months. Although some of these students probably stopped having sex or got contraceptives from other sources, some simply engaged in unprotected sex. Effective follow-up procedures may improve contraceptive continuation rates.

- *Emphasize condoms and male responsibility.* The findings in San Francisco and Muskegon suggest that clinics, schools and communities working together can have an impact on use of condoms. At those sites there were greater differences in con-

dom use than in pill use. Males are less likely than females to visit the clinic for family planning purposes, but they can be reached through sports physicals, classroom activities and other school and community activities. And, of course, females can be taught to exert greater pressure on males to use condoms.

These recommendations are not necessarily easy to implement. Some of them require additional funding and staffing, and it will remain difficult to change students' risk-taking behaviors, many of which are deeply rooted in the values and practices of the larger community. Nevertheless, by adopting some of these recommendations and by giving greater priority to reproductive health, school-based clinics may become more effective in reducing sexual risk-taking behavior.

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Adoption Versus Parenting Among Young Pregnant Women

By Debra Kalmuss, Pearla Brickner Namerow and Linda F. Cushman

Summary

Three groups of young pregnant women living in maternity residences—those who intended to place their babies for adoption, those who considered adoption but planned to parent, and those who never considered adoption—were compared regarding their socioeconomic characteristics, attitudes toward adoption and the personal influences on their decisions. Of the 430 young women, those who intended to place their babies for adoption tended to be at one extreme on most profile variables, those who had considered placing were in an intermediate position, and those who never considered placing their babies were at the other extreme. Placers were both the most advantaged socioeconomically and held the most positive attitudes toward adoption, while young women who never considered adoption were the least advantaged and held the least favorable attitudes. Placers consistently reported that their choice to place their babies rather than parent would increase the likelihood of outcomes such as continuing with school, having enough money to live comfortably and benefiting the baby's emotional development, while those young women who did not consider adoption tended to feel that these outcomes would be more likely if they parented, or that the likelihood of the outcomes would not be affected by their choice. Young women who intended to place their babies were encouraged in that direction by their mothers, fathers and boyfriends, while the two

Twice as many young women who considered adoption as those who did not reported that choosing an adoptive family, meeting them and receiving updates about the baby would have made them more likely to place the baby for adoption.

groups of women who chose parenting were encouraged to do so by those in their social networks.

Introduction

Research on pregnancy decision-making has focused almost exclusively on abortion, contrasting women who have had abortions with those who have carried their pregnancies to term.¹ The few studies of adoption have tended to use case-record data from small, clinically based samples, retrospectively comparing the psychological and socioeconomic characteristics of those who place their babies for adoption with the characteristics of those who choose to parent. Methodological limitations inherent in this approach leave us with a paucity of data about how young pregnant women choose between parenting and placing.

One reason adoption has been largely unexamined is that it is rare. In 1982, only five percent of infants born to unwed teenagers were placed for adoption.^{2*} In the 1950s and 1960s, adoption was far more prevalent among this group,³ but with the legalization of abortion and the increased social acceptance of unwed motherhood, the practice has declined steadily since the early 1970s.

These changes in law and norms may help explain the aggregate shifts in adoption rates over time, but they tell us little about adoption decision-making at the individual level. While we know that very few young women choose adoption, we do not know why so few do. Given the documented costs of childrearing to both the teenage mother and her child, it is sur-

prising that more young women who carry their pregnancies to term do not choose adoption.

To understand this phenomenon we need to find out whether young pregnant women who intend to parent ever consider adoption, and to compare their attitudes toward adoption with those of young women who plan to place their babies. Given recent legislative trends concerning parental consent laws for abortion, the number of young women who carry their pregnancies to term may increase in the coming years. Therefore, it is particularly timely to assess the differences between women who choose parenting and those who choose placing.

Three groups of young pregnant women are profiled here: those who intend to place their babies for adoption, those who intend to parent but have given some consideration to adoption, and those who intend to parent but have never considered adoption. We distinguish between the latter two groups because recent evidence suggests that pregnant teenagers may give more consideration to adoption than the current rates of placing would suggest.⁴

Methodology

Generating a sizable sample of women for a study of this sort posed a considerable challenge. There is currently no national adoption data collection system from

*The estimate of babies placed for adoption may be biased downward, as some women who have placed may not report those pregnancies in an interview. This selective underreporting of pregnancies that result in adoption is similar to that of pregnancies resulting in abortion.

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Table 1. Percentage of young pregnant women in maternity residences, by whether they considered placing their baby for adoption, according to social and demographic characteristics

Characteristics	All women (N=430)	Intends to place (N=251)	Considered placing (N=70)	Did not con- sider placing (N=109)
Race***				
Black	23.7	8.4	34.3	52.3
White	76.3	91.6	65.7	47.7
Family of origin				
Mother was a teenager at first birth***	45.9	35.4	50.7	66.7
Mother was married at first birth***	76.8	86.9	71.4	57.1
Lived in intact family until age 14**	40.1	47.5	28.4	30.8
Family had few cultural resources***	27.0	19.5	24.3	46.3
Family received public assistance***	18.8	7.4	29.4	38.8
Young woman receiving public assistance when she became pregnant***	11.5	6.4	17.1	19.4
Education				
Repeated ≥ 1 years of school*	30.9	27.9	27.1	40.4
Aspires to college or more***	63.4	72.1	61.8	43.7

* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

which it might be possible to draw a random sample of young women who have placed their babies for adoption. Furthermore, since adoption is so rare among pregnant teens, it would be prohibitively expensive to recruit a sufficiently large group of placers by sampling all pregnant teens.

Although we knew that young women who were considering adoption could be recruited from prenatal clinics, adoption agencies and maternity residences, it was apparent that maternity residences would offer us access to the greatest numbers of women who were at least considering adoption, as well as to substantial numbers of those intending to parent. With the assistance of the National Committee for Adoption, we identified those maternity residences in the United States that serve the largest numbers of pregnant teens. Twenty-three sites, all offering information and counseling on both adoption and parenting, were recruited for the study. Fieldwork began in May 1988 and continued through August 1989.

To participate in the study, women from the residences had to be aged 21 or younger, unmarried, and not of Hispanic origin. At each residence, all young women who met these criteria were informed of the study by a case worker or social worker and given a written description of the proj-

ect that explained its purpose, emphasized that participation was voluntary and assured the confidentiality of all data collected. Less than 10 percent of those eligible refused to take part in the study. The final sample was based on closed-ended interviews with 430 young women, of which 251 intended to place their babies for adoption, 70 intended to keep their babies but reported having considered adoption and 109 intended to parent and reported that they had given no consideration to adoption.

Maternity Residences

Because all the respondents in this study came from maternity residences, our ability to generalize from the findings is limited. One of the probable consequences of the sample design is that the proportion of young women who considered placing their babies for adoption may be inflated. Pregnant teenagers who themselves have some interest in adoption, or who are being encouraged to place the baby by family or friends, are often steered toward maternity residences by those who see these residences as protected environments that will support and encourage a young woman in her decision to place the baby for adoption. In our sample, 17 percent of those intending to place reported that upon first hearing that they were pregnant, they

wanted to place the baby for adoption. These women entered the residence with at least some interest in placing.

Although some pregnant women may select residences because of an expressed interest in placing, many do not bring with them any clear intentions of doing so. The residences may promote consideration of adoption, whether or not women entering the programs have such an interest, by offering exposure to the practice. First, residences are likely to provide daily interactions with peers who intend to place their babies, an experience far less likely for pregnant women who live at home and use nonresidential teen pregnancy or prenatal programs. Second, maternity residence staff are likely to discuss adoption with all young women and not just those who request information about it. Three-quarters of the respondents in our study reported that they had had a conversation with a counselor at the maternity residence about placing, including 43 percent of those who never considered placing. This suggests that placing may be routinely presented to all of the women in residences, including those who have never expressed an interest in relinquishment.

One of the consequences of recruiting a sample from a maternity residence is that the young women we interviewed were more likely to have considered adoption than those in nonresidential programs. This provides the unique opportunity to assess how those who considered placing but intend to parent differ from those who intend to place, as well as from those who never considered placing.

Background Characteristics

One theory regarding teenage pregnancy maintains that young women from relatively advantaged backgrounds are motivated to avoid early births and childrearing because these events would interfere with their opportunities for educational, occupational and economic success. According to this framework, teenagers who avoid early childrearing by placing their babies for adoption should come from more advantaged socioeconomic backgrounds than those who parent their babies. Previous research has found that placers are disproportionately white and more advantaged socioeconomically than teenagers who parent.⁵ Applying this framework to our two groups of young women who intend to parent, we would predict that those who consider adoption but go on to parent come from socioeconomic backgrounds between those of placers and those who never considered adoption.

Table 1 presents a socioeconomic profile of the sample of pregnant young women by their intentions regarding adoption and parenting. Consistent with our hypothesis, all of the background characteristics significantly differentiated between the three groups. Seventy-six percent of the sample is white and 24 percent is black. Consistent with the low rates of placing children for adoption among blacks, the group that intends to place is virtually all white (92 percent). The tendency for blacks to parent rather than to place carries over to the other two groups: While only one-third of the women who considered placing but intend to parent are black, slightly more than half (52 percent) of those who never considered placing are black.

Placers tend to come from more advantaged backgrounds than the young women who intend to parent, and those who consider placing come from more advantaged backgrounds than those who did not consider placing. Teenagers who intend to place their babies are least likely to have mothers who were teenagers themselves or were unmarried at the time of their first birth, while those who did not consider that option are most likely to have mothers who had had a first birth as a teenager or prior to marriage. Those who decided to parent after considering adoption are in a middle range on both of these variables. Those who never considered adoption are most likely, and placers least likely, to have grown up in families that received public assistance, or that rank low on a measure of cultural resources.* Again, those who considered adoption but intend to parent are between the other two groups on these measures.

The only background characteristics on which the two groups intending to parent do not differ are family structure at age 14 and receipt of public assistance at pregnancy. Placers are more likely than both of the other groups to have been in intact families, and less likely to have been receiving public assistance when they became pregnant. This suggests that while those who considered adoption may originally come from somewhat more advantaged family backgrounds than those who never considered it, that advantage has diminished by the teenage years.

Respondents' educational experience and aspirations also differentiate between the various groups. However, the educational characteristics of those who considered adoption are more comparable to those of placers than to those of young women who never considered adoption. For example, 40 percent of those who never

Table 2. Percentage of young pregnant women who intend to parent, by circumstances that would increase their willingness to place, according to whether they considered placing

Circumstance	Considered placing (N=70)	Did not consider placing (N=109)
If could help choose the adoptive family**	37.7	18.7
If could meet the adoptive family***	37.7	14.8
If could receive yearly updates about the baby***	38.6	14.7
If adoption agency would help find and pay for a doctor and a place to live*	21.7	8.3

* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

considered adoption have repeated one or more years of school, compared to 27 percent of those who have considered adoption, and 28 percent of placers. Placers are most likely to anticipate attending college (72 percent); those who never considered adoption are least likely (44 percent). Young women who have considered adoption are in an intermediate position on this variable, yet are closer to placers than to young women who have never considered adoption (69 percent).

These data are consistent with the framework described previously, suggesting that opportunities, or the lack thereof, may affect the decision to parent. Placers who come from more advantaged backgrounds than young women intending to parent may have chosen adoption because they believed early childrearing would hinder their socioeconomic achievement. The early background advantage of those who considered adoption relative to those who did not appears to recede in adolescence; this may help explain why these young women who thought about placing ultimately chose to parent, and not to place.

Adoption-Related Attitudes

We compared the three groups of young women on three sets of variables gauging attitudes towards adoption. In each case, we expected those who intend to place their babies to hold the most positive attitudes, and those who never considered placing to hold the least positive attitudes.

The first set of variables focus on whether respondents would be more likely to place the baby if they knew they could help choose the adoptive family; if they could meet the adoptive family; if they could get yearly updates about the baby; and if an adoption agency would help them find and pay for a doctor and a place

to live. These questions were asked only of the two groups who intend to parent.

Table 2 indicates that in each case, those who considered adoption are more likely to say that the particular circumstance would have increased the likelihood of their placing their baby. Twice as many young women who considered adoption as those who did not report that the three scenarios related to the adoptive family (choosing them, meeting them and receiving yearly updates about the baby) would make them more likely to place the baby. Interestingly, of all the hypothetical circumstances, the offer of financial and practical support for the pregnant teenager was the least influential in making respondents more likely to place their babies.

Table 3 (page 20) presents another set of attitudinal variables regarding adoption. We asked respondents whether they thought a young woman who places a baby for adoption wants the best for the baby; loves the baby; is selfish; is responsible; is abandoning the baby and is being a good parent in a special way. The most striking finding is that all three groups hold generally positive attitudes toward placers. As we expected, placers are the most positive on all six items, and those who never considered adoption are the least positive; but even among the latter group, at least 70 percent of the respondents offer responses favorable to adoption on four of the six items. The two items on which they were least likely to express favorable attitudes were those asking if the placer is being responsible and if she is abandoning her baby.

While the attitudes of placers and those who never considered adoption are as we expected, the attitudes of young women who intend to parent after considering adoption are not midway between these two groups. Rather, these women have positive reactions to adoption; in fact, their attitudes are much closer to those of placers than to those of women who never considered placing. This may occur because those who never considered adoption can hold more negative attitudes toward placers that remain completely detached from their views of themselves, whereas those who considered the option may be less detached, since they gave thought to becoming placers.

*The cultural resources scale reflects how many of the following characteristics were present in the respondents' households when they were growing up: someone in the household received magazines regularly, someone received newspapers regularly, someone had a library card and the family usually went away for a vacation each year.

Table 3. Percentage of young pregnant women, by attitude toward those who place a baby for adoption, according to whether they considered placing

Attitude	Intends to place (N=251)	Considered placing (N=70)	Did not consider placing (N=109)
Wants the best for the baby*	100.0	98.6	88.3
Loves the baby*	99.2	97.1	84.3
Is selfish*	1.6	7.2	17.5
Is responsible*	97.6	89.7	65.3
Is abandoning the baby*	1.6	13.0	30.8
Is being a good parent in a special way*	100.0	97.0	79.0

* $p \leq .001$.

Outcomes of the Decision

The survey also included measures of attitudes toward adoption relative to parenting. When women decide between parenting and placing they do not necessarily consider each option alone, but may consider each option in relation to the other. Consulting the literature as well as the experts in the adoption field, we identified a series of outcomes that might be differentially affected by placing versus parenting. The maternal outcomes were: continuing with school; being employed; having enough money to live comfortably; getting married; feeling mature; and improving your relationships with your mother, father and boyfriend. The child outcomes were: assuring that the baby will be well-provided for financially; assuring that the baby will grow up with two parents; and benefiting the baby's emotional growth and development. Respondents were asked about the likelihood of each outcome if they placed the baby for adoption and if they kept the baby. Likelihood was measured on a scale of very likely (4), somewhat likely (3), somewhat unlikely (2), and very unlikely (1).

Data from the analysis are presented in Table 4. Our primary focus is on the mean difference scores for the likelihood of each outcome if the respondent places or parents. These scores may be either plus or minus, with positive scores indicating that

the outcome would be more likely with placing than parenting, and negative scores reflecting the opposite. Scores at or near zero indicate that the respondent feels the outcome would be equally likely whether she parented or placed, or would not be affected by her decision. One-way analysis of variance was used to assess inequality in the mean differences across the three groups. When the F-statistic was significant, we used the Duncan multiple range test to assess which specific paired comparisons were reliably different.*

The mean differences vary significantly across the groups for all eleven outcomes. Moreover, for seven of the outcomes, the Duncan tests indicate that all of the paired comparisons are significantly different. The overall pattern of differences between the groups is that those who intend to place tend to feel that the majority of the outcomes will be more likely if they place rather than parent, while women who intend to parent are more equivocal. They feel some outcomes will be more likely with parenting, some with placing, and some equally likely whether they parent or place. Generally, the mean differences in the scores of women who consider adoption fall between the other two groups.

The mean difference scores for three maternal outcomes—having a job, having enough money to live comfortably and improving one's relationship with one's mother—differentiate between women who intend to place and those who intend to parent. They do not, however, differentiate between those who considered adoption before deciding to parent and those who did not. In each case, placers are significantly more likely than either group of those who plan to parent to view these outcomes as more likely with placing. Those who plan to parent vary more in their beliefs about the possible effects of their choice; they rate improving their relationship with their mother as more likely if they parent, but they feel that the decision to parent or place will have little effect on whether or not they are employed. They also acknowledge that having enough money to live comfortably is more likely if they place the baby.

The remaining maternal outcome items show significant differences among the three groups. Again, placers feel that each of the outcomes would be more likely with placing. Similarly, women who did not consider adoption feel that each of the outcomes would be more likely with parenting, while those who considered adoption vary across outcomes. The latter agreed with the women who did not con-

sider adoption that feeling mature, improving their relationship with their boyfriend and getting married would be more likely with parenting. However, in each case they perceive a smaller difference between the likelihood of these outcomes with placing versus parenting than do the women who never considered adoption. Moreover, they feel that continuing with school and improving their relationship with their father would be more likely with placing rather than parenting.

Table 4 (page 22) also indicates that whether women plan to place or parent, they see their own choice as most likely to benefit the baby's emotional growth and development. The two groups intending to parent do not differ significantly in their views on this outcome. All respondents agree that providing for the baby's financial well-being and having the baby live with two parents would be more likely with placing than with parenting, but the three groups differ in the degrees to which they feel their choices would affect these outcomes. Placers perceive the largest differences between the effects of placing and parenting, those who never considered adoption perceive the smallest differences and those who considered adoption are midway between the two.

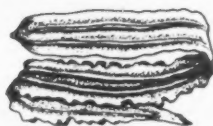
Personal Influences

Finally, we explored the nature of the influences from mothers, fathers and boyfriends on the decision to place or parent. Since we believe that teenagers may be strongly influenced by family and boyfriends when making pregnancy resolution decisions, we expected young women who plan to place to have received placing influences, those planning to parent who never considered placing to have been influenced primarily in the direction of parenting and those who considered adoption to have received more mixed influences.

Table 5 (page 23) presents data regarding the influences of respondents' mothers, fathers and boyfriends on their decisions, and shows the mean proportion of these outside influences that were in the direction of adoption. The data suggest that the actions of the young women in our sample are consistent with the preferences of their mothers, fathers and boyfriends. Placers are more likely than those planning to parent to report that they were encouraged in that direction; similarly, those planning to parent are more likely than those planning to place to report that they were encouraged to do so. While the influences on those who considered adop-

*Interpretation of the mean differences is difficult without information about the absolute ratings of likelihood. For example, a near-zero difference could mean that respondents saw a particular outcome as very likely with both parenting and placing or that they viewed it as very unlikely with either alternative. In order to interpret the difference more meaningfully we present data in Table 4 regarding the mean likelihoods of each outcome for parenting and placing.

In the beginning there was seaweed



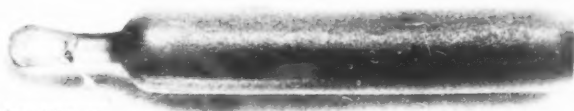
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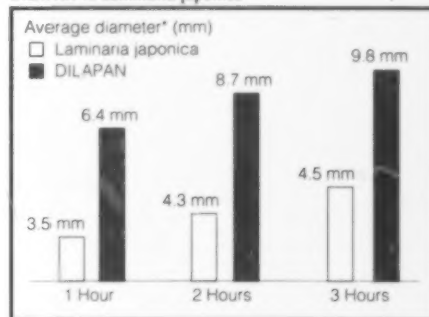
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1. Chvapil M, Drogemüller W, Meyer T, et al: New synthetic laminaria. *Obstet & Gyn* 60: 729-733, 1982

2. Data on file, Gynotech Incorporated, Middlesex, NJ

DILAPAN™ Hygroscopic Cervical Dilator

Please note: DILAPAN is different from other Osmotic Cervical Dilators with which you may have had experience. It should be used only by practitioners experienced in D&E procedures.

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A monofilament marker tag is provided to indicate location.

Principle of Action: HYPAN hydrogel absorbs moisture through hygroscopic action and gradually swells in diameter, thus dilating the cervical canal.

Indications for Use: DILAPAN hygroscopic cervical dilator is indicated for dilation of the cervix uteri prior to the termination of pregnancy up to 16 weeks.

Contraindications: DILAPAN hygroscopic cervical dilator is contraindicated in the presence of clinically apparent genital tract infection.

Warnings: DILAPAN hygroscopic cervical dilator should not be used in women who are menstruating or who are beyond 16 weeks gestation.

Precautions: 1) Clinical trials have not demonstrated any allergic reactions to the device; however, an allergic reaction could result from a hypersensitivity to the components. 2) Careful placement of the device is essential to avoid traumatic injury to the uterus or cervix and to avoid migration of the device either upward into the uterus or downward into the vagina. Refer to instructions for use—insertion/removal diagram (see diagram II). 3) Clinical trials have not demonstrated any infections related to the DILAPAN. However, in the presence of known pathogens, contamination of the device during insertion is possible. 4) The device should not be allowed to remain in place for more than four (4) hours. 5) As with all invasive procedures, patients must be kept under physician supervision. 6) Manipulation of the cervix has infrequently been associated with a vaso-vagal reaction. Patients must be carefully observed for evidence of syncope. 7) Entrapment of the DILAPAN in the cervical canal has been observed. Refer to Instructions for Use, Possible Problems with DILAPAN, Item 3. 8) Ultrasound may be used to locate the device. 9) Pulling on the marker string or twisting the device during removal may cause the device to break. 10) In the event of breakage, every attempt should be made to remove all fragments. Refer to Instructions for Use, Possible Problems with DILAPAN, Item 4. The clinical effects of fragments remaining in the genital tract are unknown.

How Supplied: 100 devices per box or 25 devices per box; available device dimensions: 4mm x 55mm, 4mm x 65mm, 3mm x 55mm; each device individually packaged in moisture resistant material and sterilized with ethylene oxide gas.

CAUTION: Federal law restricts this device for sale only on the order of a physician.

GYNOTECH



Middlesex, New Jersey 08846

Adoption Versus Parenting

tion tend to be more in favor of parenting than placing, they take an intermediate position between the influences on placers and those not considering adoption. Approximately 20 percent of the influences on those who considered adoption and then chose to parent are in the direction of placing, versus 10 percent for those who never considered adoption and 69 percent for placers. Clearly, these three groups of women reported very different advice from family members and boyfriends regarding the decision to place or parent.

Discussion

The results of this study both support and extend previous research on pregnancy decision-making. We found the same pattern of socioeconomic differences between young women who intend to parent and those who intend to place, with placers tending to be disproportionately white and to come from more advantaged backgrounds than those intending to parent. As other researchers have noted, the background characteristics of placers make educational and occupational success more likely for them than for women who choose to parent. Another finding consistent with this framework is that the socioeconomic background of those who consider but reject adoption tends to be in a middle range between that of the women in the other two groups. On the one hand, these young women may have considered placing partly because they anticipated more opportunity costs of early childrearing than those who never considered placing. On the other hand, they may have chosen to parent because they perceived fewer opportunity costs associated with this choice than do intending placers. That the advantaged background of these women relative to women who have never considered adoption tends to diminish in adolescence also may explain why they ultimately chose the same pregnancy resolution strategy as their peers who never considered placing.

The attitudinal findings extend previous research in this area in two ways. Previous research has not adequately explored how teens who parent perceive adoption; we assessed attitudes toward adoption among young women intending to parent as well as among placers. In addition, we included assessments of attitudes toward each of the given alternatives. In the past, researchers have examined one option or the other, ignoring the fact that teens may choose between parenting and placing by considering the two alternatives in relation to each other.

Table 4. Mean likelihood scores and score differences, by selected outcomes given a decision to place or to parent, according to whether respondent considered placing

Outcomes and decision	Intends to place (N=251)	Considered placing (N=70)	Did not consider placing (N=109)
Continue with school			
If places	3.83	3.71	3.41
If parents	2.39	3.57	3.61
Difference*†	1.44	0.14	-0.20
Work at a job			
If places	3.86	3.61	3.43
If parents	3.19	3.61	3.51
Difference‡	.67	0.00	-0.06
Have enough money to live comfortably			
If places	3.60	3.49	3.32
If parents	1.91	2.99	3.09
Difference‡	1.69	0.50	0.23
Feel mature			
If places	3.57	2.79	2.43
If parents	3.00	3.57	3.70
Difference*	0.57	-0.78	-1.27
Get married			
If places	3.19	2.77	2.64
If parents	2.58	2.94	3.16
Difference*	0.61	-0.17	-0.52
Improve relationship with mother			
If places	3.11	2.46	2.25
If parents	2.22	2.98	2.94
Difference‡	0.89	-0.52	-0.69
Improve relationship with father			
If places	2.99	2.48	2.22
If parents	2.12	2.38	2.65
Difference*	0.87	0.10	-0.43
Improve relationship with boyfriend			
If places	2.83	2.01	1.66
If parents	2.41	3.27	3.62
Difference*	0.42	-1.26	-1.96
Have the baby live with two parents			
If places	3.95	3.70	3.68
If parents	1.70	2.43	2.93
Difference*	2.25	1.27	0.75
Assure that the baby will be well-provided for financially			
If places	3.95	3.88	3.74
If parents	2.31	3.35	3.51
Difference*	1.64	0.53	0.23
Benefit the baby's emotional growth and development			
If places	3.87	3.45	3.28
If parents	2.83	3.70	3.76
Difference‡	1.04	-0.25	-0.48

*Duncan multiple range tests indicate that all three paired comparisons are significantly different.

†The mean likelihood scores and differences were virtually the same when this analysis was limited to those respondents for whom continuing with school was thought to be a reasonable concern (those who did not graduate high school and those with a high school diploma who were currently enrolled in school).

‡Duncan multiple range tests indicate that the paired comparisons between those who intend to place and other two groups are significantly different.

The attitudinal differences and social influences among our three groups of young women were straightforward. When compared with those planning to parent, placers were more favorable toward adoption, and felt that outcomes such as improving their relationship with their boyfriend or assuring that the baby will be provided for financially would be more likely with placing than with parenting. In addition, placers were more likely to be influenced in favor of adoption than were those intending to parent. Those who considered adoption were in an intermediate position relative to the two more extreme positions. They held more positive attitudes toward adoption and were less consistent in the belief that choosing parenting made favorable outcomes likely for themselves and their babies; and while the direction of influence from their mothers, fathers and boyfriends was towards parenting, they nonetheless reported receiving more encouragement to place than those who did not consider adoption.

Causal order is a confounding issue in interpreting these differences in attitude and influence. The data from this study do not allow us to systematically assess whether these differences in attitudes and influences preceded or followed the decisions of the young women in our sample.

Despite this limitation, the results indicate clear differences among these three groups of young women. Because all the respondents in this study came from maternity residences, however, the findings can be generalized only to this population. We suspect that the observed differences in attitudes and outside influences between young women intending to parent and those intending to place would be even greater among a nonresidence sample in which those intending to parent and those intending to place did not receive the exposure to adoption that such facilities offer.

We also find that, in maternity residences, there are two groups of women

Table 5. Percentage of influences on respondents, by person exerting influence and their decision preference, according to whether respondent considered placing

Person and preference	Intends to place (N=251)	Considered placing (N=70)	Did not consider placing (N=109)
Mother*			
To place	72.2	29.2	17.0
To parent	4.7	47.7	64.9
Other†	23.1	23.1	18.1
Father*			
To place	80.2	37.5	22.7
To parent	9.1	52.1	65.2
Other	10.7	10.4	12.1
Boyfriend*			
To place	47.8	5.9	2.2
To parent	11.9	66.7	81.5
Other	40.3	27.5	16.3
Total	100.0	100.0	100.0
Mean proportion of influences that favor placing‡	69.0	21.0	9.0

* $p \leq .001$.

†"Other" is a residual category in which the person exerting influence wanted the respondent to have an abortion, have a friend or close relative raise the baby, did not express an opinion or had mixed feelings about how the respondent should resolve her pregnancy.

‡Duncan multiple range tests indicate that all three paired comparisons are significantly different.

who intend to parent: those who have considered placing, and those who have not. While these groups have arrived at the same decision about their pregnancies, they differ in their backgrounds, their attitudes toward adoption, their expectations regarding the likely consequences of parenting and placing and in the extent to which they report their mothers, fathers and boyfriends think they should parent their babies rather than place them for adoption. In the future we will use multivariate analyses to explore why some women consider adoption but choose to parent, and whether women who say they are considering adoption are less likely to place than those with a clear intention to

place. We will also assess the satisfaction of all three groups of women with their decisions, paying special attention to the satisfaction of placers relative to the groups who intended to parent, and of those who considered placing relative to those who did not.

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Tailoring Family Planning Services to the Special Needs of Adolescents

By Laraine Winter and Lynn Cooper Breckenmaker

Summary

Experimental service protocols tailored to the needs of teenage family planning patients were developed that emphasized in-depth counseling, education geared to an adolescent's level of development, and the provision of reassurance and social support. These protocols were tested against usual service delivery practices in a study involving 1,261 patients under 18 years of age at six nonmetropolitan family planning clinics. A comparison with teenagers obtaining services at control sites found that six months after their first clinic visit, patients at the experimental sites were more likely to be using a method, were less likely to experience difficulty in dealing with problems, were more likely to continue using their method despite problems and had learned more during the educational session. Teenage patients at the experimental clinics were also less likely to have become pregnant within one year than those who went to control clinics. Attrition during the year following the first study visit was similar among both groups; patient satisfaction was very high, and equivalent at

Six months after their first clinic visit, most patients were still using their chosen contraceptive method, but those who had received services tailored to teenagers' needs were more likely than the others to have continued using their method.

experimental and control sites. The data show that the extra time and effort required to meet the special needs of teenagers is justified by their improved contraceptive use, greater knowledge and lower pregnancy rates.

Introduction

Adolescent patients of family planning clinics often fail to comply with the requirements of contraceptive method use, and thus are a group at high risk of unintended pregnancy. Research indicates that pregnancy rates among teenagers using a prescription contraceptive method range from seven percent to 13 percent per year.¹ Although these rates are a fraction of the pregnancy rates among all sexually active females of the same age,² most clinic personnel consider them unacceptably high.

Inadequate contraceptive use among very young clinic patients mirrors the statistics on contraceptive use by sexually active teenagers in general. Contraceptive practice, at least in the United States, is directly related to age, with the youngest people being the least likely to use a method. One study found that women aged 15-19 practice contraception at significantly lower rates than do women aged 20-44.³ About one-third of sexually active unmarried teenagers in the study did not use contraceptives—the largest proportion of nonusers found in any age-group. Other studies report contraceptive use at first intercourse to be substantially lower among teenagers under 17 than among older adolescents.⁴

Because the medical, economic and social consequences of childbearing in this

age-group are especially serious,⁵ efforts have been made to tailor contraceptive services specifically to teenagers' needs, and some studies have evaluated the effectiveness of such approaches. Mary Chamie and her colleagues analyzed data from selected U.S. counties, comparing those in which an average of 75 percent of teenagers at risk are served with those in which only 28 percent are served. They found that the clinics in counties where a high proportion of the need was met were more numerous, flexible, diverse, innovative, assertive and visible, and more likely to have special outreach programs for teenagers.⁶ These findings would suggest that at least some kinds of program activity tailored for teenagers do have an impact on the degree to which teenagers at risk are reached and served by family planning agencies.

Which special services are particularly effective in serving teenagers? A variety of interventions have been designed to assist teenagers in controlling their fertility. Laurie Zabin and her associates reported on an extremely effective pregnancy prevention program for teenagers in Baltimore that combined the resources of a reproductive health clinic with two inner-city schools.⁷ An important feature of the program was the accessibility of clinic staff in the schools themselves. Other interventions have been narrower in focus. For example, Pearla Namerow and her colleagues utilized a vigorous follow-up system to prevent clinic drop-out by adolescent patients.⁸ The system proved very effective and was well-received by patients. A second example is an attempt to provide

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social support for contraceptive use by encouraging family cooperation and by increasing clinic contact,⁹ but both types of intervention proved impossible to implement satisfactorily.

Some evaluation research on school-based clinics is also germane to this question, because such clinics serve young teenagers. An assessment of six school-based clinics, four of which dispensed contraceptives, found no increase in contraceptive use or reduction in pregnancy rates in the schools with clinics compared with those that served as controls.¹⁰ Yet the same study found that students who used the clinics had a higher rate of contraceptive use than students who did not. Such findings suggest that specially designed clinic services for teenagers promote contraceptive use.

The intervention evaluated in this article was broad and multifaceted, but it concentrated on the provision of family planning services within clinics rather than in schools or other community institutions. The intervention focused on service delivery for young teenagers—those under 18 years of age. Its development was guided by the idea that the medical needs of young adolescents are minimal compared with their need for information, social support and counseling.

Such psychosocial needs have been identified in several studies describing why adolescents stay away from contraceptive services. For example, the average sexually active teenager waits nearly one year after first intercourse before visiting a family planning clinic or otherwise beginning use of a medical contraceptive method.¹¹ The most frequently reported reasons for delay are fear that their visit will be disclosed to their parents, fear of the pelvic examination and concern about the effects of contraceptive methods. Many, perhaps most, teenagers worry about the pill's potential adverse effects on their health, and most who stop using it cite this as their reason.¹²

Yet most family planning clinics, like other kinds of health care providers, employ a medical model of service delivery: They are designed to meet the need for safe and appropriate medical services, but they are not explicitly set up to address patients' fears, worries or emotional conflicts. These concerns, which are major barriers to adolescents' use of clinic services and of medical contraceptive methods, may go unaddressed in the medical model of service delivery.

Underlying this intervention, therefore, is an attempt to shift the focus from the

medical model to a psychosocial model, in which the patients' need for information, reassurance and support are explicitly addressed. The first step in the development of the intervention was to reconsider the psychosocial needs of teenagers as they pertain to the teenagers' use of family planning services. We then made changes in relevant features of service delivery that could allay young patients' fears, increase their sense of comfort with the clinic and improve their self-confidence. Our hypothesis was that these factors would improve young patients' success in using their contraceptive method and in preventing pregnancy.

Program Development

A committee of personnel from several family planning clinics and of administrative staff members from the Family Health Council of Central Pennsylvania* was formed to consider the special needs of family planning patients younger than 18, with the goal of developing a set of protocols for serving them. To be representative of many viewpoints, the committee included a nurse practitioner, a receptionist, several counselors and educators, an executive director of an agency, several health care administrators and a researcher.

The committee met once a month for about one year to discuss issues surrounding family planning service delivery for young teenagers. These issues were drawn both from the members' own professional experiences and from the research literature in family planning. Prominent among the special needs considered were education geared to a less mature level of cognitive development, more reassurance of confidentiality, more information and reassurance about the pelvic examination and more time for counseling to address concerns such as patients' apprehensions about contraceptive methods.

The committee considered certain groups of teenagers to be at high risk: those who are very young or developmentally slow, who have no plans for the future, who believe that pregnancy would be okay, who lack parental support, who have intercourse infrequently or are involved in short-term relationships, or who do not initiate the clinic visit themselves. To help counselors identify such teenagers, the committee developed the Personal Information Form—a one-page questionnaire that the patient completes in the reception area. The form asks the reason for the patient's visit, how she feels about visiting the clinic, whether she is currently having

sexual intercourse, whether she is using a method (and if so, which method), whether her parents know about her visit, whether her partner knows about it and whether he approves, whether she has any fears about or anticipates any problems with using a method of birth control, what her future plans are and how she would feel about becoming pregnant. The Personal Information Form was also intended to be used as a counseling tool to identify potential problems and to start discussion with the teenager. Once identified, specific fears concerning the effects of oral contraceptives or about the pelvic examination, for example, can be discussed at greater length. The Personal Information Form was a feature of the experimental protocols, administered only at the experimental clinic sites and only during the study's treatment phase.

The protocols developed by the committee encompass a total service delivery system for adolescents, from initial contact to follow-up. A number of the critical points identified by the committee were incorporated into the protocols:

- Education was provided in a one-to-one session rather than in a group session.
- Because information should be concrete, not abstract, visual aids (such as pictures, a pelvic model or posters) were used with adolescent patients.
- To ease the teenagers' anxiety, the initial visit was scheduled as two appointments, with counseling and education at the first and the medical examination left until the second.† The two appointments were generally scheduled no more than two weeks apart. The patient began using her medical method after the second visit.
- Committee members agreed that teenagers need to make more frequent clinic visits than do older and more experienced contraceptive users, so adolescent patients were scheduled for an additional follow-up visit about six weeks after the index visit. This allowed the staff to monitor method use more closely and to detect

*The Family Health Council of Central Pennsylvania is an umbrella organization of 41 clinics providing reproductive health services in the 24-county central region of the state. The Council serves as the grantee for federal, state and local family planning services.

†The two-visit system accomplishes three objectives. First, it allows the teenager to relax during the education session by eliminating her anxiety about the pending pelvic examination. Second, it allows the counselor to take more time with the adolescent without disrupting clinic scheduling. Third, it puts the teenager in more frequent contact with the clinic. The two-part format for the initial visit was apparently well-received: Only 4.3 percent of patients did not return for the second half of their visit.

Figure 1. Evaluation design

Site	Phase		
	Baseline (months 1-2)	Treatment (months 3-8)	Follow-up (months 9-20)
Experimental	Knowledge Quiz and Patient Satisfaction Survey only	Experimental protocols and Knowledge Quiz, Patient Satisfaction Survey and Method Use Questionnaire	Treatment measures for one year
Control	Knowledge Quiz and Patient Satisfaction Survey only	Knowledge Quiz, Patient Satisfaction Survey and Method Use Questionnaire only	Treatment measures for one year

problems early, thereby preventing potential method failures.

- So that staff members could spend additional time with teenagers, clinic staff added five minutes to the initial telephone contact, 15-20 minutes to the counseling and education session and 10 minutes to the medical examination.

- All staff members received special training regarding adolescent psychosocial development.

- The teenager was made to feel as comfortable as possible during the medical examination. (For example, the headrest on the examination table was raised to facilitate eye contact and conversation between the patient and the clinician.)

- A staff person was designated as the teen counselor and received special training.

- Whenever possible, male participation was encouraged throughout the process; parents or friends could also participate. The protocols included guidelines for involving others, but provided the patient with time alone with the counselor prior to the others' participation.

- Staff members helped adolescent patients recognize and resist peer pressure.

- Staff members strongly encouraged parental involvement with teenage patients, while clearly communicating the teenager's right to confidential services.

Evaluation Methodology

- *Measures.* The evaluation was designed to assess three broad components of the intervention: the knowledge patients acquired, their feelings about the clinic, and

their family planning experiences—especially their contraceptive use, clinic attendance and any unintended pregnancy. Four measurement tools were developed—the Knowledge Quiz, the Patient Satisfaction Survey, the Method-Use Questionnaire and the No-Show/Continuation Report.

The Knowledge Quiz, consisting of 11 true-false items, assessed patients' mastery of the information they received during the counseling and education session. The scores should reflect the effectiveness with which clinic personnel conveyed necessary information concerning basic reproduction, contraceptives and sexually transmitted diseases. The Quiz was administered at the conclusion of each of three consecutive clinic visits, beginning with the index visit.* Patients completed the Quiz after the medical examination. After each patient had completed her Quiz, she was given an answer sheet so that clinic personnel could correct any misunderstandings before she left the clinic.

The Patient Satisfaction Survey was administered at the end of the patient's index visit. It contained nine questions about specific aspects of each patient's subjective experience as a family planning patient, including how comfortable she felt in the clinic, how well contraceptives were explained, how well she liked the clinician, how well she liked the counselor-educator, what she thought about medical aspects of her care, and how she assessed the clinic overall. Each question was evaluated on an 11-point Likert scale (scored 0-10). In addition, the questionnaire contained four questions (answered with "yes," "no" or "undecided") on whether she had to wait a long time at the clinic, whether she intended to return to the clinic, whether she would recommend the clinic to others and whether she believed that services were confidential. The Patient Satisfaction Survey also included questions on demographic information, such as the patient's age, race and religious affiliation. To safeguard the accuracy of the data set, information from the

other forms could not be entered into the computer for analysis unless a Patient Satisfaction Survey had first been completed and entered.

The Method-Use Questionnaire was used to document patients' contraceptive use and pregnancy status at all follow-up visits. It was completed by a staff member during the patient interview at the time of each follow-up visit. This questionnaire was considered the most objective measure of the program's effectiveness: It recorded information about each patient's contraceptive use, asked if the patient was still using the same method or had changed to a different one (and if so, which method), whether she had experienced side effects or other problems with the method (and if so, which), whether she had had any problems in dealing with side effects, and whether she had become pregnant since her index visit. Once the Method Use Questionnaire was completed, it was placed in the patient's medical file to serve as a reminder that another such form should be completed at her next visit.

Finally, the No-Show/Continuation Report was designed to compile information about a patient's clinic attendance. Information on all patients enrolled in the study was recorded by the agency receptionist and the project coordinator. The report provided details such as the date the patient called to make her appointment, the date the index visit was scheduled and whether the patient kept the appointment (or, if not, whether she called to reschedule and whether she then kept her appointment), and the dates of subsequent appointments, along with a record of whether she kept the appointment or called and rescheduled. The form provided enough space to record two opportunities for the patient to reschedule. These data were recorded on a log kept by the receptionist (one log per patient) and begun on the day the patient called for her first appointment.

- *Design.* The intervention was evaluated using a pretest-posttest design with exposed and nonexposed groups of nonrandomly selected patients;† the study design is depicted in Figure 1. During a two-month baseline phase, the six clinics in the study administered the Patient Satisfaction Survey and the Quiz. At the end of this phase, staff members from the three clinics designated as the experimental sites attended a two-day training session: On the first day, they heard lectures on adolescent psychosocial and cognitive development; on the second, they were instructed how to administer the protocols and the various measures.

*Unfortunately, the number who completed the Quiz for the third time (127) was too small to allow worthwhile comparison. Therefore, only the findings from the first two administrations of the Quiz are reported here.

†Random assignment of patients to the experimental intervention was not possible for two reasons: First, if different protocols were used by the same staff members with different patients, much confusion would undoubtedly have occurred; second, because the experimental protocols required more time per patient than standard service-delivery practices, scheduling would have become very complicated, and this could have compromised staff cooperation.

For the next six months (the treatment phase), patients at the experimental sites received services as outlined by the experimental protocols. (These included both first-time patients and those making their annual visit, and the protocols were administered in exactly the same way to both types of patient.) The three control clinics continued their usual service delivery practices. Information was collected from patients at both experimental and control sites for one year after each patient's index visit.

This experimental design has several advantages. First, the equivalence of the experimental and control sites can be assessed by comparing data collected at the two types of sites during the baseline phase. Second, the design allows comparisons to be made both by type of treatment (during the treatment phase) and by time (baseline vs. treatment phase). Thus, we avoid possible confounding from changes occurring naturally over time by allowing for intersite comparisons, but also allow at least some pretest-posttest comparisons within each clinic, so that the influence of extraneous clinic factors such as differences in staff effectiveness or patient population can be established.

• **Site Selection.** Because random assignment of patients was not feasible, it was especially important that we select equivalent study sites. We chose six family planning providers for which we could establish equivalence regarding such important community characteristics as racial and age distribution, municipal per capita income and percentage of families with an annual income below poverty level. Second, all six clinics used the same staffing pattern, a modified form of primary nursing in which the patient sees the receptionist and only one or two other staff members during her visit. (A previous study has shown that staffing pattern can affect patient satisfaction as well as other parameters, such as efficiency and cost-effectiveness.¹³) Patient continuation rates in the year prior to the study were slightly higher at the three control sites than at the experimental sites; thus, the experimental sites had no advantage in patient retention prior to the study.

• **Study Population.** A total of 1,261 patients were enrolled in the study. Most met the criterion of being aged 17 or younger; a few 18-year-olds were enrolled at the discretion of clinic staff members who considered them at risk for some other reason (for instance, if they were developmentally slow). Table 1 shows that during the baseline period, 251 patients who met the

Table 1. Number and percentage of patients, by clinic site, according to type of visit and to study phase.

Visit type and study phase	Site					
	Total N	%	Experimental N	%	Control N	%
Total	1,256	100.0	518	100.0	738	100.0
Initial	773	61.5	348	67.2	425	57.6
Baseline	136	10.8	54	10.4	82	11.1
Treatment	637	50.7	294	56.8	343	46.5
Annual	483	38.5	170	32.8	313	42.4
Baseline	115	9.2	39	7.5	76	10.3
Treatment	368	29.3	131	25.3	237	32.1

criteria for inclusion in the study were enrolled—136 making an initial visit and 115 making an annual visit; the treatment phase involved another 1,010 patients. Overall, 62 percent of study participants were making their initial visit and 39 percent were making their annual visit; the proportion making an initial visit was higher at the experimental sites than at the control clinics, especially during the treatment phase (69.2 percent vs. 59.1 percent, $p=.001$).*

The large majority of patients were white, with only one percent black and less than one percent Hispanic. More than 40 percent were aged 17, almost 34 percent were aged 16 and about 16 percent were aged 15. Twenty-two percent were Roman Catholic, the single largest religious group in the sample. The distribution of these characteristics reflected the overall distributions of age, race and religious affiliation in the family planning clinic population in this region.

• **Psychometric Characteristics of Measures.** Cronbach's alpha was used to compute the internal consistency of the scales used in this study, and factor analyses were performed to determine each scale's factor structure. As we expected, the Satisfaction Scale was revealed to have high internal consistency (Cronbach's alpha=.84). A factor analysis performed with oblique rotation revealed that all elements of the scale grouped together as one factor. Thus, the Satisfaction Scale is measuring one unified construct.

The psychometrics of the Quiz were more problematic. For the first administration of the scale, Cronbach's alpha was quite low (.24), although it was somewhat higher at the second administration (.38). It would seem that the knowledge tapped by the Quiz does not form a unitary construct (i.e., that knowledge of one item is not correlated with knowledge of other items). This low reliability undoubtedly reflects the fact that the scale was short

and the items true-false. A factor analysis also revealed only one underlying factor, indicating that the scale did not break down into groups of items.

Results

• **Baseline Comparisons.** To further ensure the equivalence of control and experimental sites prior to the start of the intervention, we compared data collected during the two-month baseline phase, when the Satisfaction Survey and the Quiz were administered to the 251 patients making either initial or annual visits. Quiz scores at the experimental and control sites did not differ during this phase, confirming that the six sites provided similar information to their patients. However, the satisfaction scores showed slightly higher levels at the experimental clinic sites than at the control sites (9.48 vs. 9.27, $p=.034$). Since the intervention had not yet been implemented, and since mean patient satisfaction had not differed in the previous year,¹⁴ the best explanation for this difference is probably that people tend to perform better when they are participating in something new and special (known as the Hawthorne effect). In this case, knowing that they had been selected to implement the new protocols, the staff members at the experimental sites may have been more enthusiastic than those at the control sites.

• **Baseline and Treatment-Phase Comparisons.** If the experimental protocols were effective in improving services to patients, scores on the Quiz and on the Satisfaction Survey should be higher for treatment-phase patients than for baseline patients, but only at the experimental sites. Table 2 (page 28) presents the mean scores for

*Statistical comparisons are made using independent-means t-tests or Chi-square tests. In reporting statistical findings, we have followed the convention of interpreting as statistically significant relationships for which p values are .05 or smaller. P values between .05 and .10 are considered marginally significant.

Table 2. Number of patients and mean scores on Knowledge Quiz and on Patient Satisfaction Survey, by study phase, according to site

Measure and site	Baseline		Treatment	
	N	Score	N	Score
Knowledge Quiz				
Experimental	91	82.7	370	86.9
Control	158	81.7	577	81.1
Patient Satisfaction Survey				
Experimental	92	9.48	361	9.27
Control	155	9.27	568	9.25

these measures. A two-by-two factorial analysis of variance performed on the Quiz scores revealed a significant interaction between study phase and site type [$F(1,1192)=4.59, p=.032$], and post hoc tests confirmed that the interaction was caused by the superior improvement of Quiz scores among patients at the experimental sites [$t(459)=2.43, p=.015$]. Scores at control sites remained unchanged. The same pattern was not observed for Patient Satisfaction Survey scores, however. In fact, scores at both the experimental and control sites were slightly lower during the treatment phase than they had been during the baseline phase. The two-by-two analysis of variance revealed no interactions.

• *Treatment-Phase Comparisons.* The Method Use Questionnaire* provided several measures of the patients' success in using their contraceptive method. Since a goal of counseling is to prepare patients to cope with and overcome potential problems with their chosen method, one of the most important of these measures is patients' continued contraceptive use. The upper panel of Table 3 presents the percentages of patients returning for six-month and 12-month visits who were still using their original method. In general, at all sites, the large majority of returning patients had continued to use their method, but the patients at the experimental sites were more likely to have stayed with their original method than were patients at the control sites. Differences at the six-month visit were more likely to be statistically significant

and were attributable to the patients whose index visit was their initial visit rather than those whose index visit was an annual visit. (Most method problems experienced by the latter group presumably would have been resolved previously.) The differences at the 12-month visit were smaller, both because problems would have been resolved and because the overall number of patients was smaller.

The lower panel of Table 3 presents the percentages of patients who continued to use any method (their original method or any other, including condoms). Again, percentages among patients at the experimental sites consistently exceeded those among patients at the control sites. However, these differences were statistically significant only among the patients making their six-month visit.

At their six-month and 12-month visits, patients also were asked to rate the difficulty or ease with which they dealt with method-related problems, on a scale from 1 (for greatest ease) to 4 (for greatest difficulty). According to Table 4, at their six-month visit, patients at the experimental sites reported significantly greater ease in coping with these problems (score of 1.68) than did those at the control sites (2.03). By the 12-month visit, however, group differences diminished, with only those whose index visit was their initial clinic visit showing even a marginally significant difference.

How likely are patients who do experience a problem with their method—either a side effect or another problem, such as cost or partner objections—to continue using their method? We explored this issue by comparing the percentage of patients at the experimental and control sites who encountered method problems but nevertheless continued to use their method. A total of 239 patients reported at their six-month visit that they had experienced method problems, and 124 acknowledged such problems at their 12-month visit. Table 5, which shows the proportion of such patients who were continuing to use their contraceptive method, indicates a large difference between the experimental and control sites in the proportions who stayed with their method despite problems. This difference was even larger at the 12-month visit than it was at the six-month visit, with over 70 percent of problem patients at the experimental sites continuing to use their method, compared with only 40 percent of those at the control sites.

Rates of pregnancy can be calculated in two ways—either as a proportion of the

Table 3. Number and percentage of treatment-phase patients still using original contraceptive method, and number and percentage using any method, all as of six-month and 12-month visits, by type of index visit, according to site

Timing and type of visit	Site			
	Experimental	Control		
	N	%	N	%
USING ORIGINAL METHOD				
As of six-month visit				
All	218	92.4	415	84.9***
Initial visit	138	94.5	224	83.3***
Annual visit	80	88.9	187	87.0
As of 12-month visit				
All	149	89.8	179	81.0**
Initial visit	97	88.2	94	81.0
Annual visit	52	92.9	85	80.9*
USING ANY METHOD				
As of six-month visit				
All	228	97.4	444	92.1***
Initial visit	140	96.6	241	91.6**
Annual visit	88	98.9	198	92.5**
As of 12-month visit				
All	158	95.8	194	92.4
Initial visit	105	95.5	102	91.1
Annual visit	53	94.4	92	93.9

*Difference between experimental and control sites is statistically significant at $p<.10$.

**Difference between experimental and control sites is statistically significant at $p<.05$.

***Difference between experimental and control sites is statistically significant at $p<.01$.

740 patients for whom follow-up data were available (the continuation sample, about 73 percent of the original sample) or as a proportion of the total original sample (1,010). Table 6 (page 30) presents pregnancy rates calculated in both ways. There were 45 known pregnancies among the study participants, which represents 5.4 percent of the continuation sample and 4.5 percent of the original sample. The data in Table 6 indicate that, with considerable consistency, the rate of pregnancy among the patients at the experimental sites was lower than that among patients at the control sites; however, subgroup differences usually did not attain significance at $p<.05$. Race cannot have been a confounding factor, both because nonwhites were distributed across the clinics and because only one nonwhite had a pregnancy.

Patients scored very high on the Quiz, which was administered at the conclusion of the index visit. All but five items were answered correctly by at least 95 percent of the patients. Although these unexpectedly high scores would seem to presage a ceiling effect, we nevertheless found that mean scores were significantly higher ($p<.001$) at the experimental sites (86.9) than at the control sites (81.1). This differ-

*The questions on contraceptive use were phrased "as of" the current visit. Thus, percentages in the tables represent the experience of patients still using methods as of the six-month or 12-month visit. The pregnancy question was worded: "Have you had a pregnancy since your initial/annual visit?" It did not ascertain whether the patient was currently pregnant, because we assumed that a patient would come in for a pregnancy test when she suspected pregnancy and would not wait for a scheduled check-up. Therefore, few could be expected to answer "yes" if asked if they were currently pregnant.

ence in Quiz scores remained in the second administration of the Quiz, when mean scores remained significantly higher ($p < .001$) at the experimental sites (89.0) than at the control sites (83.3).

Therefore, even though the Quiz was unexpectedly easy and its internal consistency was low, the scores revealed differences between sites that can only be attributed to the intervention, since sites did not differ on this measure during the baseline period. Differences in scores between the first and second administration of the Quiz were computed, and experimental and control sites were compared on these scores using the *t*-test. These differences were not statistically significant.

Patient continuation rates are another important type of evidence of the equivalence of the experimental and control samples: Clearly, if the experimental sites experienced a significantly different drop-out rate than the control sites, all subsequent comparisons would be compromised, because once the highest-risk patients dropped out, the patients at the experimental sites at subsequent visits would represent a more "elite" sample. However, 166 patients from the experimental sites (39.1 percent) and 221 from the control sites (37.8 percent) attended a designated 12-month visit; thus, continuation rates were equivalent at both types of sites. (This represents a relatively high drop-out rate compared with the attrition rates reported in other research.¹⁵)

Patient satisfaction, as measured by the Satisfaction Survey administered at the conclusion of the index visit, was very high. On a 0-10 scale, most mean scores fell between 9 and 10. These high ratings probably produced a ceiling effect. In any case, differences between experimental and control sites on both the individual items and the composite score were not statistically significant, although the experimental sites were generally rated slightly higher than the control sites. Therefore, there is no evidence that the experimental protocols produced better patient satisfaction than did the service provision approach at the control sites.

Discussion and Conclusions

The findings of this research support the idea that tailoring family planning services to the special psychosocial needs of teenagers has beneficial effects on most outcomes and undesirable effects on none. Most measures showed that the intervention had substantial effects, the most powerful and consistent of which were on contraceptive use. Despite the Quiz's low

internal consistency and unexpectedly high results, the scores followed a pattern perfectly consistent with the hypothesis, improving significantly from baseline to treatment phase only among experimental patients. The new protocols did not produce a higher attrition rate, indicating that the additional required clinic visits did not deter young patients, and that satisfaction with clinic services was equivalent (and very high) at both types of clinic sites.

The cost of the intervention was in the extra personnel time needed to counsel and instruct patients. The clinic workers from whom the greatest share of additional time was required were the counselor-educators, who spent an extra 20 minutes with each patient at the index visit, as well as additional time with them at their first revisit. However, the extra time spent on counseling and education and the earlier return visit represented an investment that paid off in patients' improved skill and success in using contraceptives.

Perhaps the major limitation of the project was the lack of information about patients who dropped out. Pregnancies among study drop-outs may not have been identified. The attrition rate should not pose a threat to the interpretation of the data, however, because there is no reason to believe that the number of pregnant drop-outs differed between the experimental and control sites. The data from patients who experienced method problems showed higher rates of continued method use among patients at the experimental sites, which suggests that the experimental protocols enhanced patients' ability to cope with method-use difficulties. If this ability held for the dropouts, those from the experimental sites may even have experienced fewer pregnancies than those from the control sites. Nevertheless, the lack of data from dropouts leaves unanswered some important questions about the effects of the protocols.

Our experience with patient attrition provides an important lesson for anyone designing a longitudinal study of teenagers: Provision should be made at the outset for a high attrition rate, and an aggressive follow-up system for tracing patients should be implemented. Namerow and her colleagues described such a system, in which the clinic ascertained several kinds of information on the patient (including the names and telephone numbers of friends) that would enable clinic personnel to contact the patient.¹⁶ Patients were assured of confidentiality and provided only the information that they

Table 4. Mean scores reporting treatment-phase patients' difficulty in dealing with problems related to contraceptive use as of six-month and 12-month visits, by type of index visit, according to site

Timing and type of visit	Site			
	Experimental Score†	N	Control Score†	N
As of six-month visit				
All	1.68	62	2.03***	91
Initial visit	1.68	41	2.00*	52
Annual visit	1.67	21	2.11*	38
As of 12-month visit				
All	1.84	50	2.11	38
Initial visit	1.85	34	2.29*	17
Annual visit	1.81	16	1.69	16

*Difference between experimental and control sites is statistically significant at $p < .10$.

**Difference between experimental and control sites is statistically significant at $p < .05$.

***Difference between experimental and control sites is statistically significant at $p < .01$.

†On a scale from 1=least difficulty to 4=greatest difficulty.

wished, yet the clinic had much more information with which to locate them. As a result, the clinic was successful in contacting a large proportion of patients. Any future efforts at evaluating a service-delivery intervention for teenagers should incorporate a vigorous follow-up system.

In addition, several measures could be improved or simply dropped in future studies. Patient satisfaction ratings were exceedingly high, confirming an earlier finding from a similar questionnaire.¹⁷ Administration of such a measure takes clinic time but yields little useful information. Thus, its inclusion in future studies is probably not justified. The Quiz yielded

Table 5. Number and percentage of treatment-phase patients experiencing problems with their contraceptive method who continued to use that method as of six-month and 12-month visits, by type of index visit, according to site

Timing and type of visit	Site			
	Experimental N	%	Control N	%
As of six-month visit				
All	59	78.7	92	56.1***
Initial visit	39	83.0	53	55.2***
Annual visit	20	71.4	38	57.6
As of 12-month visit				
All	42	71.2	26	40.0***
Initial visit	28	68.3	14	40.0**
Annual visit	14	77.8	12	40.0**

*Difference between experimental and control sites is statistically significant at $p < .10$.

**Difference between experimental and control sites is statistically significant at $p < .05$.

***Difference between experimental and control sites is statistically significant at $p < .01$.

Table 6. Number and percentage of continuing treatment-phase patients (N=740) and number and percentage of original treatment-phase sample (N=1,010) reporting a pregnancy at any clinic visit, by age and type of visit, according to clinic site

Age and visit type	Continuing patients				All patients			
	Experimental		Control		Experimental		Control	
	N	%	N	%	N	%	N	%
Total	13	4.0	32	7.8**	13	3.1	32	5.5*
≤15	4	5.0	7	7.1	4	3.6	7	5.0
16-17	8	3.3	25	8.0**	8	2.6	25	5.7**
Initial	8	3.5	13	5.6	8	2.7	13	3.8
Annual	4	4.9	18	10.4	4	3.9	18	7.6

*Difference between experimental and control sites is statistically significant at $p < .10$.

**Difference between experimental and control sites is statistically significant at $p < .05$.

***Difference between experimental and control sites is statistically significant at $p < .01$.

Note: Age and visit data were not available for one of the experimental patients, and visit information was not available for one of the controls.

interpretable data, even though the scores were high and the internal reliability low. Any such quiz used in future research should be longer (which would in itself increase its reliability) and more difficult. Finally, the No-Show/Continuation Report, in which the receptionist recorded appointment dates and noted whether or not patients kept appointments, proved difficult to implement. Our experience leads us to regard the future use of such an instrument as unjustified.

Comparable future research should have a leaner design, with a vigorous follow-up system, fewer measures and more time at the end to track down follow-up data from clinic dropouts. It should be easier for clinics to implement, involve less information to manage and yield more data from each patient.

A future study along the lines of the one reported here should target a population that includes substantial numbers of black and Hispanic teenagers. Although the problems of adolescent pregnancy may be somewhat different in such populations, family planning services tailored to the needs of adolescents may nevertheless be very effective with them as well. Certainly, it would be extremely valuable to know whether these protocols

have similar effects in inner-city clinics that serve minority patients.

In conclusion, the overall pattern of data in our study indicates that the investment of extra time and effort to address the nonmedical needs of adolescent family planning patients pays off. The tailored protocols helped these patients use their methods successfully, continue using them despite problems, deal with problems more easily and use another method upon abandoning their original method. These achievements would be worthwhile in and of themselves. More important, however, the emphasis on psychosocial needs seems to help patients avoid pregnancy, the bottom line of family planning service provision. These benefits certainly justify the costs of the additional time and effort.

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Comment

Parental Notice and Consent for Abortion: Out of Step with Family Law Principles and Policies

By Marcia D. Greenberger and Katherine Connor

In 1990, the U.S. Supreme Court in *Hodgson v. Minnesota*¹ allowed a state to require, with limited exceptions, notification of both parents before a young woman under 18 has an abortion, as long as the law provides a judicial bypass procedure. The judicial bypass permits the minor to petition a judge to authorize the abortion without her parents' involvement if the judge finds that she is mature enough to give informed consent or that notification is not in her best interests.

This article compares the requirement of parental involvement in a minor's abortion decision with family law and policies in other, related situations. It will show that the requirements regarding abortion are out of step with many of the general principles of family law.

Background

The Minnesota statute² upheld in *Hodgson* requires physicians to notify both parents of a minor's intention to have an abortion, unless the procedure is necessary to save the young woman's life, both parents have given their written consent to the procedure or the minor reports to the authorities that she has been sexually or physically abused by a parent. Notice to one parent suffices only if the other parent is dead or cannot be located after a "reasonably diligent effort." Thus, a divorced or separated parent, a noncustodial parent or even one who has never known the minor must be notified, unless the minor opts to use the judicial bypass.

The Supreme Court's opinion in *Hodgson* has two separate rulings. First, a majority that included Justices John Paul Stevens, William Brennan, Harry Blackmun, Thurgood Marshall and Sandra Day O'Connor

struck down the law's absolute requirement that both parents be notified. This majority held that the blanket two-parent rule conflicted with the best interests of the minor, infringed on family autonomy and failed to foster the state's alleged goal of improving parent-child communication. In her concurring opinion, O'Connor noted that "Minnesota had offered no sufficient justification for its interference with the family decision-making processes."³

O'Connor, however, then joined the Court's other four members—Chief Justice William Rehnquist and Justices Anthony Kennedy, Antonin Scalia and Byron White—to produce the second ruling, namely, that with a judicial bypass the two-parent notice requirement is constitutional. She concluded that with the bypass, the statute did not so severely harm minors and their families as to be unconstitutional.

As Table 1 (page 32) indicates, 41 states have laws on the books addressing the issue of parental involvement in a minor's abortion. Only 17 states currently have laws in effect,* however; in the other states, the statutes have been enjoined or are not enforced. (The legal status of some of these unenforced laws may be reconsidered in the wake of the *Hodgson* decision.) Nine of the laws that are enforced require parental consent and five mandate parental notification. In addition to the Minnesota statute, laws in Arkansas, Massachusetts, North Dakota and Utah† require the involvement of both parents.

Three other states have taken a different approach to the issue of parental involvement. Connecticut and Wisconsin require that the minor be counseled by the provider and encouraged to notify a parent or other adult family member,‡ while Maine requires the consent of a parent or other adult family member or counseling by a health care professional, a member of the clergy or a guidance counselor.

The Supreme Court's decision in

Hodgson does not necessarily imply that the justices would uphold every parental consent and notification law that includes a judicial bypass. In Minnesota, the vast majority of minors using the judicial bypass had their petitions granted in a relatively timely fashion. The Supreme Court might not be willing to uphold a law where it could be demonstrated that minors' access to the bypass option was restricted, that large numbers of minors' petitions were denied or that other major problems were present.

Moreover, whether or not these parental consent and notice laws are constitutional, they run counter to fundamental principles of family law, which seek to protect the privacy of family decision-making from government interference and to protect the best interests of the minor in the exceptional circumstances when the government must intervene in family affairs. They may also conflict with carefully drafted court-ordered custody and parental decision-making arrangements. In addition, such laws are out of step with the common state practice of allowing minors themselves to consent to medical services relating to sensitive health concerns, particularly those services related to sexual activity. Furthermore, laws that mandate the involvement of both parents in a minor's abortion are in conflict with the general rule of requiring only one parent's consent before a minor may receive medical treatment.

Protecting Privacy

In a line of cases stretching back more than half a century, the Supreme Court has recognized that the Constitution guarantees

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*Another parental consent law, in Michigan, will take effect April 1, 1991.

†The Utah law is currently being applied to require notice to one parent.

‡Connecticut statute applies to minors under age 16.

Table 1. State laws on parental involvement in a minor's abortion, by status, year enacted and requirements of the law

State	Status	Year enacted	Requirements		
			Type of involvement	No. of parents	Judicial bypass
Alabama	enforced	1987	consent	one	yes
Alaska	not enforced	1970	consent	one	no
Arizona	enjoined	1989	consent	one	yes
Arkansas	enforced	1989	notice	two	yes
California	enjoined	1987	consent	one	yes
Colorado	enjoined	1967	consent	one	no
Connecticut	enforced	1990	other*	na	no
Delaware	not enforced	1970	consent	two	no
District of Columbia	none	na	na	na	na
Florida	enjoined	1988	consent	one	yes
Georgia	enjoined	1988	notice	one	yes
Hawaii	none	na	na	na	na
Idaho	not enforced	1983	notice	two	no
Illinois	enjoined	1983	notice	two	yes
Indiana	enforced	1984	consent	one	yes
Iowa	none	na	na	na	na
Kansas	none	na	na	na	na
Kentucky	enjoined	1986	consent	two	yes
Louisiana	enforced	1981	consent	one	yes
Maine	enforced	1989	other†	one	yes
Maryland	not enforced	1977	notice	one	no
Massachusetts	enforced	1980	consent	two	yes
Michigan	effective 4/1/91	1990	consent	one	yes
Minnesota	enforced	1981	notice	two	yes
Mississippi	enjoined	1986	consent	two	yes
Missouri	enforced	1979	consent	one	yes
Montana	not enforced	1974	notice	one	no
Nebraska	enjoined	1981	notice	one	yes
Nevada	enjoined	1985	notice	one	yes
New Hampshire	none	na	na	na	na
New Jersey	none	na	na	na	na
New Mexico	not enforced	1969	consent	one	no
New York	none	na	na	na	na
North Carolina	not enforced	1967	consent	one	no
North Dakota	enforced	1981	consent	two	yes
Ohio	enforced	1985	notice	one	yes
Oklahoma	none	na	na	na	na
Oregon	not enforced	1969	consent	one	no
Pennsylvania	enjoined	1988	consent	one	yes
Rhode Island	enforced	1982	consent	one	yes
South Carolina	enforced	1990	consent	one or grandparent	yes
South Dakota	not enforced	1973	consent	one	no
Tennessee	enjoined	1988	consent	two	yes
Texas	none	na	na	na	na
Utah	enforced	1974	notice	two‡	no
Vermont	none	na	na	na	na
Virginia	not enforced	1970	consent	one	no
Washington	enjoined	1970	consent	one	no
West Virginia	enforced	1984	notice§	one	yes
Wisconsin	enforced	1985	other*	na	no
Wyoming	enforced	1989	consent and notice	one	yes

Note: Where a state has more than one law on the books, only the most recent has been included; na=not applicable.

*Provider must counsel and encourage minor to notify a parent or other adult family member. In Connecticut, the law applies only to minors under age 16.

†Consent of one parent or other adult family member or counseling of minor.

‡Currently being applied to require notice to one parent.

§A second physician may waive notice if minor is mature or notice is not in her best interest.

certain realms of liberty and privacy that protect family decisions from unwarranted governmental interference. Family relationships and decision-making may be subject to government interference only when the state has a compelling reason to intervene. The Court has ruled, for example, that a state may not require parents to send their children to public schools,⁴ or force parents who want to educate their children at home for religious reasons to comply with a law requiring school attendance.⁵ The Supreme Court has also struck down state barriers to the use of birth control,⁶ as well as laws that interfere with a woman's right to terminate an unwanted pregnancy.⁷

More recently, the Court in *Moore v. East Cleveland*⁸ declared unconstitutional a local zoning ordinance that defined "family" to include only parents and their children and would have permitted landlords to evict extended families that did not fit that definition. The Court held that the zoning law was an unconstitutional attempt by the government to standardize family decisions about who would live together.

Similarly, laws that require parental involvement in a minor's abortion prevent families from resolving sensitive, highly personal matters without governmental interference and, as in the *Moore* case, may conflict with a family's judgment about how it should function. Indeed, a majority of the Supreme Court in *Hodgson* quoted from the *Moore* decision in holding that any asserted interest in notification of both parents is invalid because such action attempts to make "the 'private realm of family life' conform to some state-designated ideal."⁹

Under their respective state constitutions, some state courts have found additional protections for minors' access to abortion without parental involvement beyond those protections afforded in *Hodgson* and previous Supreme Court cases interpreting the U.S. Constitution. The Florida Supreme Court, for example, invalidated a one-parent consent statute that included a judicial bypass as a violation of state constitutional privacy protections.¹⁰ And a California court enjoined that state's one-parent consent law from going into effect, also as a violation of state constitutional protections.¹¹ These courts held that the justification for mandatory parental involvement in a minor's abortion decision was not sufficiently compelling to outweigh the minor's right to privacy in deciding whether to terminate an unwanted pregnancy.

Case-by-Case Decision-Making

Given the strong tradition of privacy, states intrude in family decision-making only under limited circumstances, usually when a family is disrupted by divorce or separation, or is dysfunctional, and a court must determine custody and decision-making arrangements or take steps to protect children from harm. Most states have adopted the "best interests of the child" as a key criterion for decisions regarding the care and custody of children,¹² when courts must decide the degree to which each parent will be involved. Given the vast differences in the contours and dynamics of the American family, the family law that has developed to address those circumstances emphasizes that a determination of the child's best interests must be made on a case-by-case basis, "since no two cases are exactly alike."¹³

A variety of factors are used by the courts in making a "best interests" determination. These include the wishes of the minor; the wishes of the parents; the parent-child relationship; the parents' ability to make shared decisions about the minor's welfare; the minor's adjustment to the situation; and the mental and physical health of all the individuals involved.¹⁴ Thus, family law recognizes that each case involves unique circumstances that must be taken into account in any determination of the minor's best interests. Automatic parental involvement in the abortion context, especially mandatory two-parent participation, is inimical to the individualized decision-making recognized in family law as essential to protecting the best interests of the minor.

Some have argued that the judicial bypass procedure, which allows a judge to exempt a minor from a blanket parental involvement law, permits the case-by-case decision-making that is necessary to protect the young person's best interests. However, laws that force minors to resort to the bypass procedure remove central family privacy and decision-making protections and turn family law principles on their heads. Rather than reflecting the general family law presumption that families should operate without state interference or rigid state mandates, with intrusion being the exception to the rule, laws that require parental involvement in a minor's abortion decision establish government intrusion as the rule, the exception being individualized decision-making through the judicial bypass.

Under the judicial bypass, a minor must go to court for permission to implement what would otherwise be a private per-

sonal and family decision. When the participation of one parent is required, the young woman's own right to consent to sensitive health services in consultation with her health care provider is thwarted. In the case of mandatory involvement of both parents, the departure from family law principles is even more extreme. The minor must go to court, even if she has informed and has the support of one parent.

In Minnesota, for example, the district court found that 20-25 percent of minors using the bypass procedure were either accompanied by one parent or had already informed one parent that they were pregnant and intended to obtain an abortion.¹⁵ These minors and their parents were forced to reveal details of their private lives to strangers (the judge, court clerk, court reporter, bailiff, law clerk and others in the courtroom)—a process that produced fear, tension, anxiety and shame among minors and their parents.¹⁶ Thus, while the judicial bypass does permit case-by-case decision-making when the minor is able to avail herself of the procedure and the procedure is operating properly, it does not eliminate violations of privacy or harmful state interference.

Sole Custody

For O'Connor, the fact that only half of all minors in Minnesota live with both biological parents was a compelling reason to reject two-parent notice of a minor's intention to have an abortion unless a bypass was available. Indeed, the conflict between mandatory two-parent involvement in a minor's abortion and family law principles is particularly severe in single-parent homes in which one parent has been awarded sole custody of the child. The purpose of sole custody is to give one parent the legal authority to make decisions on behalf of the child.¹⁷ A statute requiring the involvement of a noncustodial parent in a minor's abortion creates a right of participation that is inconsistent with the custodial parent's legal status and may directly conflict with a court's determination that the involvement of the second parent is contrary to the minor's best interests.

In some states, sole custody is awarded only after a trial court has specifically determined that joint custody is not in the minor's best interests.¹⁸ Even in states where such findings are not required by law, courts will often consider and reject joint custody before awarding sole custody in a particular case. In Missouri, for example, the court of appeals rejected a

father's petition for joint custody, citing evidence that he had not used the visitation period already allotted to him, had physically abused the children's mother and had had the water to the family's house cut off while the children were living there.¹⁹

Courts have rejected joint custody and awarded sole custody when there is evidence of abuse or maltreatment by one parent toward the spouse or the child;²⁰ when the parents are unable to communicate and cooperate in promoting the child's best interests;²¹ when the parents have unresolved anger toward each other that manifests itself in battles over the child;²² and when parents are unable to make shared decisions, including decisions about medical care for their child.²³ Courts have also revoked joint custody when it did not operate in the minor's best interests.²⁴

Given the often compelling reasons for granting sole custody, it may be potentially dangerous, as well as inconsistent with a court's determination of a minor's best interests, for a legislature to create a statutory right of the noncustodial parent to be involved in his or her daughter's abortion decision. The record in the *Hodgson* case shows that relationships between the minor and the noncustodial parent were not established or reestablished as a result of mandatory notice and that the custodial parent was often angry and fearful that notice to the other parent would threaten custody rights or otherwise promote intrafamily conflict or violence. The record also shows that a number of minors in Minnesota were victims of incest, neglect and violence and that notification further exacerbated family turmoil.²⁵ Indeed, the law's disregard for the prospect of such family turmoil if both parents were notified discouraged many minors who would otherwise have informed one parent of their plans from doing so; since they were going to have to go to court anyway, they chose to use the judicial bypass without informing either parent.²⁶

Mandatory involvement of both parents has been justified as a way of protecting the rights of the noncustodial parent.²⁷ This line of argument, however, elevates the rights of noncustodial parents, including those who have never participated in the upbringing of their children and those whose parental rights could be terminated because of neglect or abandonment, beyond the level at which they have been recognized in family law. In proceedings relating to adoption and termination of

parental rights, for example, courts focus heavily on the nature of the parents' relationships with their child—a showing not required by laws such as Minnesota's that create an automatic right of both parents to be involved.

In deciding the constitutionality of laws governing the rights of unwed fathers in adoption proceedings, for instance, the Supreme Court has emphasized the importance of evidence about the relationship between the father and the child. Where there is no evidence that the father has cared for, supported, associated with or in any way legally demonstrated his interest in maintaining a relationship with the child, the mother's consent has been sufficient to permit the adoption.²⁸

Similarly, a state's ability to terminate parental rights upon a showing that a parent has neglected his or her obligations demonstrates that parenthood does not carry with it the unalterable rights upon which mandatory parental involvement in the abortion context is predicated. "Where a parent consistently fails, over a substantial period of time, to communicate with [a] child, to support [a child] or to take any real interest in [a] child, the courts will hold that this is sufficient basis for a finding of abandonment"²⁹ and termination of parental rights.

Yet, under the Minnesota statute upheld in *Hodgson*, parents who have never attempted to foster a relationship with their child and those who have neglected or abandoned their child are granted a right to be notified of their daughter's abortion. They even have the right to sue a physician who violates the notification requirement. Creation of this right in parents who have demonstrated complete disinterest in the welfare of their children clearly contravenes the basic principles of family law.

Joint Custody Rights

Even when both parents have a relationship with their child, family law does not automatically vest each of them with the authority to participate in every decision regarding the minor. Joint custody provides a key mechanism for formalizing decision-making by both parents. It is intended to approximate the ongoing decision-making of an intact family,³⁰ and therefore provides important insights into how family law principles might treat the abortion decision.

The meaning of joint custody varies widely, depending on the specific facts and circumstances of a particular family. Just as in intact families, where parents' participation in decisions regarding their child

may differ, so, too, the definition and application of joint custody vary from state to state and from family to family.³¹ The American Bar Association's "Model Joint Custody Statute" explicitly recognizes that in cases of joint legal custody, the court may designate one parent to have sole authority to make certain decisions and give both parents equal rights and responsibilities for other decisions. For example, the parents may have joint authority to decide which school their child will attend, but only one parent may have the legal authority to make decisions about the minor's health care. While some court orders require joint decision-making or information sharing between parents, other arrangements, which are not as expansive regarding both parents, may have been carefully tailored to meet the child's best interests. In these situations, laws requiring two-parent involvement in the abortion decision may conflict with court findings on how decisions should be made.

This conflict is analogous to problems of intact families in which parents are unable to make joint decisions about what is best for their child. Courts have, in fact, repeatedly recognized the parents' inability to make joint decisions when the marriage was intact as a basis for denying both joint custody and joint decision-making when the marriage dissolves.³²

In those instances where joint decision-making works, either through joint custody or the practices of intact families, legislation mandating two-parent involvement is irrelevant, since the information is already shared. Yet, even in families with a joint decision-making structure in place, both parents are not necessarily always willing or able to participate in every decision regarding their child. These parents may have decided that it is best for all concerned if, with regard to certain issues, only one parent will be involved, or that the minor should consult another family member—for example, an aunt or grandmother. Helping a daughter to resolve a problem pregnancy might be such an issue. In situations where joint decision-making is not appropriate, a state law requiring rigid parental involvement is out of step with the family law goals of protecting the best interests of the minor and of letting families make sensitive decisions in private.

Consent for Medical Care

When a minor of any age requires medical attention, the general rule among states is that one parent must give permission for the child to be treated.³³ Many states, how-

ever, recognizing that minors may be reluctant to seek care for sensitive health concerns if they have to tell their parents, have enacted laws allowing minors themselves to consent to certain services. This recognition reflects the concerns of health care professionals who have argued vigorously that parental consent requirements are a major barrier preventing minors from seeking services related to sexuality and treatment of substance abuse and mental health problems.³⁴

States have been especially mindful of a minor's need for privacy in obtaining services related to sexual activity: Almost half permit minors to consent to family planning services; over half authorize minors to consent to pregnancy-related care; and almost all allow minors to consent to treatment for sexually transmitted diseases. In addition, two-thirds of the states have laws specifically allowing minors to consent to health care related to drug and alcohol abuse, and several others permit minors to consent to treatment for one of these addictions. Almost half the states permit minors to consent to outpatient mental health services.³⁵ While some of these laws permit the parents to be informed that the minor has received treatment, notification is almost always left to the physician's discretion, and then is allowed only in cases where for medical reasons it would be in the minor's best interests³⁶—in contrast to mandatory notification laws for abortion.

States recognize not only that confidentiality can be the critical factor in encouraging minors to address sensitive health problems, but also that many minors—even some as young as 14 or 15³⁷—are competent to make their own decisions about medical care, as reflected in statutes and court decisions that permit "mature" and "emancipated" minors to consent to medical treatment. Some states, for example, allow minors to give consent if their physician determines that they are sufficiently intelligent and mature to understand the nature and consequences of the treatment. And most states consider minors who are living apart from their parents and managing their own financial affairs, married, or in the Armed Forces to be emancipated and therefore legally authorized to consent to their own medical care.³⁸

State recognition that mandatory parental involvement should not be required when minors are mature or when sensitive health services are involved demonstrates that such involvement is not always appropriate and may act as a deterrent to seeking treatment. Thus, if a legislature's purpose is to ensure the health and well-

being of minors, confidentiality is necessary for all sensitive health care services, including abortion. The only purpose actually served by parental consent and notification laws is the restriction of minors' access to abortion.

Conclusion

Laws that mandate parental consent or notification for abortion conflict with key principles of family law, including the right to privacy in family decision-making and the case-by-case decision-making that is essential to protect minors' best interests, when the state intrudes in family matters. In the case of mandatory two-parent involvement, such laws may also directly conflict with court judgments awarding one parent sole custody over a child and with the limited legal rights granted to noncustodial parents in other areas of family law. Mandatory notification or consent may also disrupt carefully tailored joint custody arrangements in which one parent has been awarded the legal authority to make decisions about a child's health care, or informal arrangements within an intact family that parents need not participate in all decisions affecting their child. In addition, mandatory parental involvement for abortion runs counter to the privacy protections guaranteed minors in other areas where confidential health care is necessary, and, in some cases, with the general rules governing consent for minors' health care.

Moreover, there is no demonstrated need for these consent or notification laws. Professional ethics and legal standards³⁹ already impose on health care providers the responsibility to counsel fully all patients—minors and adults—to ensure that they understand a particular medical treatment and its alternatives and are capable of giving informed consent. This approach, rather than mandatory parental involvement, best concurs with family law and health care principles.

Finally, these laws can cause serious harm. As the majority of the Supreme Court found in *Hodgson*, mandatory parental involvement can spark a family upheaval that would otherwise not occur

and can be extremely dangerous for young women who live in homes where physical, psychological and sexual abuse is present.⁴⁰ The prospect of mandatory disclosure to either or both parents has led minors to travel to states without such laws,⁴¹ and to delay their abortion decision, thus increasing the health risks of the procedure.⁴² Some young women may even wait so long that the option of abortion is unavailable to them and they have no alternative but to continue the pregnancy. Minors who have a child face a lifetime of serious consequences, including dramatically increased chances of being poor* and of low educational status.† Genuine concern for the best interests of minors argues strongly against mandatory parental consent and notification laws.

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A Tribute

Louis M. Hellman (1908–1990)

On July 22, 1990, Louis M. Hellman died at the age of 82 of complications of Parkinson's disease. Lou, as he was known to his friends and colleagues, had lived in Washington since 1970, when he assumed the newly created position of deputy assistant secretary of population affairs in the Department of Health, Education and Welfare (HEW). To do so, he left his post as chairman of the Department of Obstetrics and Gynecology at the State University of New York–Downstate Medical Center and head of obstetrics and gynecology at the municipal Kings County Hospital, where he was directly responsible for the provision of medical care for thousands of New York City's needy women and infants each year. This transition, from chief of New York City's largest maternity service to highly visible political appointee, was not as surprising as it might appear on the surface: While this eminent teacher, researcher and lecturer was a social activist with the empathy to recognize the needs and aspirations of the largely indigent and minority women on the hospital wards, he was also a man of vision who recognized the relationship between individual well-being and the problems of global poverty, environmental degradation and population growth.

Lou Hellman's professional career was traditional and straightforward in most aspects. After graduating from Yale, he received his medical degree and did his residency in obstetrics and gynecology at Johns Hopkins University where, following a stint in the army during World War II, he later taught as an associate professor. In 1950, he was named to his post at Downstate Medical Center, where he transformed a fledgling department into a prestigious institution. For 20 years, he taught and oversaw teaching, conducted and oversaw research and, most of all, provided and supervised patient care. In the process, he tried to instill in his staff and

students the then unfashionable notions that good patient care required respect and compassion along with technical expertise and that the nurturing of a personal relationship between physician and patient was critical to good medicine. When most physicians opposed the development of nurse-midwifery as a career, he recognized that the skills and abilities of nurse-midwives could not only be key to relieving the shortage of physicians but could improve the quality of patient care itself.

The breadth of Dr. Hellman's scientific interests is reflected in his 185 or more published medical papers. These include articles on placental function, hemorrhagic disease of the newborn, obstetrical anesthesia, uterine contractility and intravenous pituitary extract in labor. He also wrote extensively about tubal surgery, heart rate measurements, contraception, obstetrical ultrasound and the early detection of cervical cancer. He served as editor for the 13th and 14th editions of the most prestigious text in obstetrics, *William's Obstetrics*, and contributed to several other editions as well. Largely at his instigation, the 1971 edition devoted 11 pages to contraception, a subject not generally considered worthy of much attention by the medical profession at that time. As chairman of the Advisory Committee on Obstetrics and Gynecology to the Food and Drug Administration, Dr. Hellman headed a review of the risks and benefits of the first oral contraceptives and recommended protective safeguards for their use.

But while Dr. Hellman could make scientific judgments and teach students about methods of birth control they could prescribe later in their private practices, he was strictly barred from discussing birth control with his own medically needy patients: It was the unwritten but scrupulously enforced policy of the time that contraception could never be discussed with a patient in a publicly supported fa-

cility, even at the patient's expressed request or in a dire medical situation. The ban was attributed to the power of the Catholic Archdiocese of New York and its strong grip on the politics and politicians of the city. Even though pressure was growing in medical circles to change this policy, the process was excruciatingly slow, and invisible to the general public. On July 16, 1958, Dr. Hellman decided to confront the issue straight on. He announced that he was planning to fit a diaphragm for a severely diabetic woman who had delivered several times by cesarean section and whose life would clearly be jeopardized by a future pregnancy. With the patient already on the examining table, a call came in from the commissioner of hospitals ordering Dr. Hellman to halt the procedure. Dr. Hellman complied, but gave the story to an alerted press.

For two months, the story occupied the front pages of all the city's newspapers and received considerable attention in the national news media as well. Predictably, the commissioner's position was defended by the Catholic hierarchy and Catholic lay and medical groups. The surprise was the strength of public support galvanized by this "incident." Protestant and Jewish organizations and nearly every public-spirited organization in the City and State of New York denounced the commissioner's policy; in the face of unmistakable public opinion the ban had to give way, and it did. It was not, however, until the mid-1960s that New York City's public hospitals and health clinics authorized the provision of contraceptives for other than strictly medical reasons.

Dr. Hellman was at the forefront of a change in attitudes toward contraception and the role of government in helping individuals and families plan and space their children. During the 1960s, concern about rapid population growth, newly perceived threats to the environment, the desire to

alleviate poverty at home and abroad, and the growing recognition of the rights of individuals—and of women in particular—to self-determination all combined to sway public opinion and policy. The federal government, in Dr. Hellman's words, moved from the attitude of "nothing could be further from the business of government," to "advise if asked," to "help if asked." Federal legislation providing support for family planning programs both at home and in less developed countries began to be introduced and passed.

In 1969, President Nixon called for greatly expanded family planning services and research on fertility control and population dynamics. In 1970, the Family Planning Service and Population Research Act (Title X of the Public Health Act) was passed to do just that. This ambitious piece of legislation, sponsored by Senator Tydings of Maryland, James Scheuer of New York and Texas Congressman George Bush, also provided a mandate for a highly visible presence in the federal government to represent family planning and population concerns. It created the new post of deputy assistant secretary for population to administer all HEW family planning

services (not just Title X), as well as all population research efforts. The deputy assistant secretary's office was to act as a clearinghouse for information on all domestic and international programs and provide a liaison with other federal agencies carrying out programs in the field.

Dr. Hellman was persuaded to come to Washington to fill this tall order. During his tenure, from 1970 to 1976, he took charge of the new population activities of the federal government; enormous progress was made in legitimizing government involvement in this previously controversial area. In fact, the nationwide system of publicly supported family planning clinics that was developed during that period continues to exist today, although on a much weakened and underfunded basis.

However, the vision behind the Family Planning Service and Population Research Act and the recommendation of the Commission on Population and the American Future soon ran afoul of politics. There were other hard realities: the difficulties inherent in making several sprawling bureaucracies work together; the budgetary pressures that began to emerge in the mid-1970s; and, most of all, the political back-

lash created by the 1973 Supreme Court decisions on abortion. As early as October 1975, Dr. Hellman expressed concern in his presidential address to the American Gynecological Society that congressional and administration priorities were shifting away from family planning and population, and warned of the consequences of inattention and inaction. As we now know, matters were only to become worse in the 1980s.

Those who observed and knew Lou Hellman over a lifetime, or even for a relatively short period, can testify to his tenacity, his integrity and the force of his convictions. His legacy resides in the countless individuals his life touched and, in particular, the generation of young physicians he trained and the new nurse-midwives whose profession he championed. During his tenure at Downstate, no less than 4,000 medical students were trained and 71 residents completed their medical apprenticeship under his supervision; of these, a great many now occupy important leadership positions. This legacy gives promise that the 1990s may see renewed interest in the causes he so ably and courageously pursued.—*Jeanne I. Rosoff*

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Documents

U.S. Supreme Court Considers New Title X Regulations

The U.S. Supreme Court heard oral arguments October 30, 1990, in a lawsuit challenging regulations promulgated by the Reagan administration to govern the Title X family planning program. The 1988 regulations bar Title X clinics from providing any information about abortion—even neutral factual information—to women faced with a problem pregnancy, while requiring clinics to refer all pregnant women for prenatal care. The regulations are a sharp break with the rules that had governed the program since 1981, requiring clinics receiving Title X funds to provide, on request, “nondirective” counseling about all options, including abortion.

The Reagan regulations also mandate that Title X-funded services be physically as well as financially separate from any privately funded abortion-related services provided by the clinic. Previously, clinics were prohibited from using Title X funds to provide abortions, but could offer abortion services in the clinic as long as such services were funded by private sources. In addition, the new regulations bar Title X grantees from using private funds for activities that encourage or promote abortion.

The case before the Supreme Court, *Rust v. Sullivan*, is on appeal from the U.S. Court of Appeals for the Second Circuit in New York, which in 1989 affirmed a district court decision upholding the regulations on both statutory and constitutional grounds. (Two other federal appeals courts, the First Circuit in Boston and the Tenth Circuit in Denver, subsequently declared the regulations unconstitutional, but those cases are not before the Supreme Court.) Planned Parenthood of New York City and the City and State of New York are the petitioners in the Supreme Court appeal.

The challengers contend that the 1988 regulations violate the First Amendment free speech rights of organizations that

receive Title X funds, of physicians and other health professionals who work in the family planning clinics and of pregnant women who attend the clinics. They also argue that Congress never intended the prohibition in the Title X statute against “the use of funds in programs where abortion is a method of family planning” to prevent Title X grantees from providing abortion counseling and referral.

A decision in the case is expected by early summer. Excerpts from the petitioners’ and the government’s briefs follow.

Planned Parenthood Brief

... Since Title X was enacted, ... Congress has barred the use of funds for the provision of abortions as “a method of family planning,” ... (“section 1008”) ... but until 1988, HHS [Department of Health and Human Services] had consistently interpreted this directive as having no bearing on speech and information between a doctor or counselor and her patient and had expressly permitted nondirective abortion counseling and referral by Title X programs. In sharp contrast, however, and without any intervening directive from Congress, the new regulations decree an end to the era of full medical information for pregnant women in Title X clinics.

... Section 59.8 ... of the new regulations provides that a “Title X project may not provide counseling concerning the use of abortion ... or provide referral for abortion.” Rather, under the new regulations, “once a client served by a Title X project is diagnosed as pregnant, she must be referred for appropriate prenatal and/or social services by furnishing a list of available providers that promote the welfare of the mother and unborn child.” ... If a pregnant client asks for information about abortion or its availability, the Title X physician or counselor is to reply that “the project does not consider abortion an ap-

propriate method of family planning.” ...

The new regulations further require that the mandatory referral list for prenatal care itself be skewed against the option of abortion. The list must include any available prenatal care providers “who do not perform abortions,” but may not include providers “whose principal business is the provision of abortions.” ... Moreover, the Title X physician is prohibited from identifying those providers on the list, if any, that perform abortions. ...

... In addition, section 59.9 requires a Title X project to be “organized so that it is physically and financially separate” from “prohibited” activities. “Mere bookkeeping separation of Title X funds from other monies is not sufficient.” ... The determination of the “objective integrity and independence” of the Title X project will turn on the “existence of separate accounting records,” the physical segregation of “treatment, consultation, examination and waiting rooms,” the “existence of separate personnel” and the absence of “signs and material promoting abortion.” ...

... Finally, section 59.10 prohibits activities that “encourage, promote or advocate abortion.” The prohibition reaches all activities or information that “assist” a woman in obtaining an abortion or that make the abortion option more “accessibl[e].” The ban thus extends to the provision of pamphlets, books or sex education lectures that touch upon the subject of abortion ...

... The challenged regulations strike at the heart of what the First Amendment protects. They plainly “prescribe what shall be orthodox” in the dialogue between a Title X health professional and her patient ... while proscribing the discussion of “ideas” or information that the Secretary considers “dangerous,” ... Face-to-face with a patient in need, a Title X health professional under these regulations will be compelled to communicate the Secre-

tary's ideological slant against abortion and to selectively excise government-disapproved, but entirely truthful, information about abortion from discussions with all pregnant patients...

... The hallmark of the doctor-patient relationship is frank and uninhibited dialogue on subjects pertinent to medical conditions and medical choices. ... Regulations that excise all nonpejorative references to abortion from that dialogue do not leave intact the role of the physician. ... Instead, they transform the physician, otherwise free to exercise her professional discretion on a case-by-case basis, into a government bureaucrat without any discretion at all.

A woman who comes to a doctor working in an institution that receives Title X funds, like all patients, believes that her doctor will give her full information about her legally available and medically appropriate options. She is neither told, nor can she typically afford, to seek a second opinion. ... [T]rusting in a [health professional] who unbeknownst to her is not free to act as an advisor in her best interests, the Title X patient is susceptible to being misled and unable to filter out the distortion that the government imposes on her doctor's advice. ...

... [T]he challenged regulations expressly require Title X recipients to spend non-Title X funds to provide incomplete and biased medical information. ... [They] specifically subject "grant funds, grant-related income or matching funds" to the restrictions on speech in sections 59.8 and 59.10. ... Because the regulations ... condition the Title X grant on the unavoidable relinquishment of speech about abortion funded by those non-Title X sources that are within the Title X project, they violate the First Amendment. ...

... In addition, section 59.9 severely impairs and may render physically impossible the effort of Title X grantees to engage in protected speech by consolidating programs supported with financially segregated funds. ... Section 59.9 will cast asunder the delicate financial balance of the nonprofit and public entities participating in the Title X program ... because programs funded by non-Title X sources that necessarily include the speech prohibited by sections 59.8 and 59.10 must be run in physically separate locations. ...

... The undisputed record below makes clear that at least 50 percent of Title X clinics lack the resources to duplicate and sustain waiting rooms, treatment rooms, equipment and staff ... entirely distinct from those of the Title X program.

... Moreover, it would be grossly inefficient and wasteful to do so.

... The regulations ... subject all women to health risks that are a direct consequence of the mandated provision of misinformation. Under any standard of review, these regulations impermissibly interfere with the Fifth Amendment rights of women seeking medical care at Title X clinics.

... An agency construction of a statute that raises grave constitutional concerns must be rejected unless clearly authorized by Congress. At a minimum, the language, structure and history of Title X do not reveal the requisite clear intent to support the Secretary's construction; indeed, petitioners submit that the agency's new construction is contrary to the statute's language and intent. ...

... The challenged regulations purport to interpret a narrow exception in the Title X statute: "None of the funds appropriated under [Title X] shall be used in programs where abortion is a method of family planning." ... A clinic that provides counseling services to pregnant patients about a range of options, including abortion, is not in ordinary parlance one that uses abortion "as a method of family planning." As commonly understood, this phrase denotes the use of abortion as a substitute or equivalent to a method of contraception.

State and City of New York Brief

... Taken alone, the words of section 1008 denote only that Congress wanted to exclude the abortion procedure from the range of family planning methods under Title X. The word "abortion" commonly refers in both general and medical usage to the act or procedure of terminating a pregnancy. ...

... [B]y requiring Title X programs to provide both family planning "methods" and "services," Congress treated the two as distinct concepts. Section 1008 excludes only a particular family planning method—abortion—from the Act's scope. Nothing in the statute authorizes a similar restriction on the range of comprehensive family planning "services" to be provided ...

... The regulations conflict with the plain meaning of section 1008 in yet another way. They interpret "programs where abortion is a method of family planning" to embrace programs where any form of counseling or referral for abortion takes place. Yet it is clear that Congress was concerned with the specific possibility of funding abortions as a substitute for

preventive family planning, not with the possibility of providing information about any and all uses of abortion ...

... Congress' intention that the services provided by Title X grantees be broad in scope permeates the legislative history. For example, a ... Senate Report ... emphasizes that "family planning [is not] merely a euphemism for birth control. It is properly a part of comprehensive health care and should consist of much more than the dispensation of contraceptive devices."

... The legislative sources also reveal that Congress specifically intended the comprehensive services funded by Title X to include counseling and referral ...

... Even if the Court views congressional intent on the counseling and referral issue as ambiguous, however, it should not accord much weight to the newly devised administrative construction proffered by HHS. It is well-established that regulations that are neither consistent nor longstanding are entitled to little deference. ... The regulations challenged here reverse a longstanding agency policy that permitted nondirective counseling and referral for abortion. ...

... The Secretary articulated two bases for his radical change in interpretation of section 1008. First, he claims that section 1008 requires a prohibition on nondirective counseling and referral for abortion.

... Second, [he] concludes ... that the current guidelines "do not faithfully and effectively maintain the prohibition contained in section 1008." ... He cites two grounds for this conclusion: (1) that the language in prior guidelines fails to offer "clear and operational guidance" to grantees for preserving the distinction between Title X programs and abortion as a method of family planning; and (2) that the [HHS] Office of the Inspector General ... and the GAO [General Accounting Office] had urged the Secretary—five years earlier—to give more formalized direction to grantees on the prohibition in section 1008. ... The GAO Report specifically concluded that there was "no evidence that Title X funds had been used for abortions or to advise clients to have abortions," and "no indications that any women were advised or encouraged to have abortions." ...

... What really prompted the Secretary to [issue the new regulations] was political pressure to bring the Title X program into line with the Reagan administration's position on abortion. ... Indeed, the Secretary has conceded that the new regulations are the result of a shift in the political climate. ...

The Government's Brief

... In 1982, the General Accounting Office (GAO) and HHS's Office of the Inspector General (OIG) completed investigations into alleged misuses of Title X funds. ... The GAO concluded that HHS "needs to set forth clear guidance on the scope of abortion restrictions in its Title X program regulations and guidelines" and "needs to make its guidance [with respect to abortion advocacy] more specific and consistent." ... Like GAO, the OIG recommended that HHS "give more specific, formalized direction to programs about the extent of prohibition on abortion as a method of family planning." ...

... The Secretary accordingly adopted the regulations at issue here to resolve the ongoing uncertainty and confusion concerning the use of Title X funds; ... and to effectuate more faithfully the underlying congressional policy, embodied in Section 1008, against the use of Title X funds in any way to encourage or promote abortion. ...

... The Secretary determined that allowing Title X projects to engage in abortion counseling and referral is inconsistent with Title X's limited function of funding pre-pregnancy family planning services and with HHS's longstanding policy of forbidding Title X funded activities that promote or encourage abortion. ...

... The Secretary also determined that new requirements were necessary to strengthen HHS's existing policy requiring that if a Title X grantee provides abortion services, those services must be "separate and distinct" from a Title X funded project. ...

... Finally, the Secretary concluded that allowing Title X projects to engage in abortion advocacy is inconsistent with congressional intent and HHS's longstanding policy of forbidding Title X funded activities that promote or encourage abortion. ...

... This Court's decisions in *Webster*,¹ *McRae*,² *Poelker*,³ and *Maher*⁴ establish that the government need not finance abortions or provide public facilities and personnel for their performance. By the same token, the government need not finance the provision of information about abortion, whether that information is provided in the form of counseling, referral or advocacy. Even assuming what we do not concede, what has not been shown and what is hardly intuitive—that a woman may encounter difficulty in obtaining abortion information if Title X projects do not provide abortion counseling, referral or advocacy—that difficulty is not a government-created obstacle. The woman is in precisely the same position she would occupy

if Congress had not enacted Title X. ...

... The regulations state that a Title X project can provide only certain types of family planning services, but they in no wise prevent the project from acknowledging that fact. To the contrary, the Title X regulations leave a participating project and its employees entirely free to advise clients that the project provides a service but only a limited service: it provides only pre-pregnancy services, and clients should go elsewhere if they desire either abortion-related counseling and services or obstetric care in carrying the child to term. Similarly, a Title X project is entirely free to advise those who are pregnant that the project's referral list of prenatal care facilities ... includes providers that promote the welfare of the mother and the unborn child and does not include entities whose principal business is the provision of abortions. Thus, the regulations do not require Title X projects to deceive their clients. ...

Petitioners are ... incorrect in asserting that the regulations intrude in an unconstitutional manner on the woman's relationship with her physician. ... The regulations do not prevent a woman from obtaining abortion information; she simply must seek it from a source other than a Title X project. ...

Petitioners further argue that the regulations violate the "free speech rights of private health care organizations that receive Title X funds, of their staff and of their patients." ... Petitioners specifically contend that the regulations impermissibly "impose viewpoint-discriminatory conditions on government subsidies" and "penaliz[e] speech funded with non-Title X monies." ... Petitioners' arguments ... reflect a mistaken understanding of the First Amendment's application to the Title X program. ... [T]he government can selectively fund a program that "encourage[s] actions deemed to be in the public interest"⁵ ... without providing funding to encourage other actions that a private individual wishes to promote. ...

... The government's decision against funding the exercise of what might amount to "speech" concerning abortion imposes no affirmative obstacle on the person who is free to engage in such speech without federal funding and therefore does not infringe any constitutional right. ...

... Petitioners are manifestly wrong in suggesting that the Title X regulations restrict the speech of Title X grant recipients. A Title X grantee and a Title X project are two distinct entities. The grantee, which is normally a health care organization ... may receive funds from a variety

of sources for a variety of purposes.

... However, it receives Title X funds for the specific and limited purpose of establishing and operating a Title X project. ... The grantee, however, can continue to perform abortions, provide abortion-related services and engage in abortion advocacy. The grantee is simply required to conduct those activities through programs that are separate and independent from the project that receives federal funds. ...

... The employees [of the grantee] remain free ... to pursue abortion-related activities, whether favoring or opposing abortion, when they are not acting under the auspices of the Title X project. ...

... Petitioners contend that ... the regulations ... are neither required nor expressly authorized by the language, structure or history of Title X." ... The court of appeals (like the district court) correctly rejected that argument, holding that "the language and history of Title X are fully consistent with the regulations challenged in the instant case." ...

... [E]ven if ... Congress approved of a past administrative policy of allowing nondirective counseling, ... it would not mean that the Secretary has no discretion to change that policy.

... HHS has consistently taken the position that Section 1008 requires some degree of physical and financial separation between Title X projects and abortion-related activities. However, based on experience, the Secretary concluded in the course of preparing the 1988 regulations that the informal guidance that HHS had previously given had failed to assure adequate separation. The GAO and OIG reports and testimony from private individuals revealed that grant recipients frequently failed to keep their Title X preventive family planning and infertility services separate from their abortion-related activities; consequently, there was a real likelihood that federal funds were being used for prohibited purposes.

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2. *Harris v. McRae*, 448 U.S. 297 (1980).
3. *Poelker v. Doe*, 432 U.S. 519 (1977).
4. *Maher v. Roe*, 432 U.S. 464 (1977).
5. *Ibid.*

Letters from Readers

The Childless Option

The September/October issue of *Family Planning Perspectives* was insightful and informative. I was dismayed, however, by a statement in "The Sexual and Reproductive Behavior of American Women, 1982-1988" [22:206]. Jacqueline Darroch Forrest and Susheela Singh write that "almost all U.S. women intend to have children at some time in their lives" [p. 211].

This is simply not true. According to the 1988 National Survey of Family Growth (NSFG), conducted by the National Center for Health Statistics, nearly four million women aged 15-44 are childless by choice. Further, over one million women aged 35-44—nearly one in 10 in that age-group—are intentionally childless.

Please don't perpetuate the stereotypical thinking that all women want to have children. For many more women than our society realizes, childlessness is a truly viable option.

Lynne S. Dumas
New York City

The Authors Reply:

Dumas correctly points out that not all women in the United States want to have children and, indeed, childlessness is a viable and honorable option for both women and men in our society. However, the fact is that the proportion of women who are voluntarily childless is small.

Of the 4.1 million women whom Dumas terms childless by choice—women who have no children and neither want nor intend to have any in the future—19 percent were estimated by the 1988 NSFG to be physically unable to have a child because of their own or their partner's physical condition or because their health would be endangered by a pregnancy. Thus, only 3.3 million women—5.7 percent of all women aged 15-44 in 1988—were able to have a child, but did not intend to do so in the future.

This estimate of the number of women who are voluntarily childless undoubtedly still overstates the proportion of women who actually choose not to have children. The survey asked only if these women intended to have a child in the future, not if they wanted to have a child. Some women may have wanted to do so but felt unable to because of factors such as their marital status, age or income. The cumulative impact of these life situations among older women may be why larger proportions of women aged 35-44 who are physically able to bear children have not done so and do not intend to do so than is true of women aged 20-29 (6.3 percent vs. 4.4 percent).

Condom Use on Campus

There is a confusing inconsistency in the report of the rate of condom use in the digest "High-Risk Sexual Behavior Remains Common Among College Women but Condom Use Rises" in the July/August issue of *Family Planning Perspectives* (22:185, 1990). Early in the report, the rate of "regular condom use" is given as 25 percent in 1989; in fact, as stated later, the percentage of women "always or almost always" using a condom when having intercourse rose from 12 percent in 1975 to 21 percent in 1986 to 41 percent in 1989.

One of our biggest concerns about this survey is the authors' interpretation of the data. We are troubled by statements such as "public health campaigns have not had a substantial influence" on the habits and behavior of college women.* This is true of the number of sexual partners and types of sexual activity, but it is certainly not true of the practice of condom use: What is a threefold increase in condom use if not a substantial change in habit and behavior? We are also troubled by statements such as "there has been little change in sexual practices in response to new and serious epi-

demics of sexually transmitted diseases, with the exception of an increase in the use of condoms (which still does not reach 50 percent)."[†] What rate of condom use among college students do we feel is acceptable, or realistic? In the general population, the rate was recently reported as eight percent—in comparison, 41 percent is truly amazing.

It should not be surprising that students' sexual practices have not changed in the past 14 years, even in light of AIDS and other sexually transmitted diseases. College students are often still adolescents, are not willing to confront their mortality and vulnerability to disease, and are inclined to take risks. We also know that sex—under the influence of alcohol or other drugs or both—is common on college campuses; this makes condom use even more difficult.

Certainly we, too, would like to see an even higher rate of condom use on college campuses, but we feel it is important to view the survey findings as a glass half-full rather than half-empty. As college health professionals, we have our work cut out for us. However, given the age-group with which we work, and their stage of adolescent development, we find a threefold increase in condom use encouraging. It tells us that sexual behavior and practices have changed over the past 14 years, since using condoms is both a behavior and a practice.

The overwhelming response of students on our campus to the publicity surrounding this survey has been very different from the response of "grown-ups." The students are impressed by what they consider a significant increase in the rate of

(Continued on page 48)

*B. A. DeBuono et al., "Sexual Behavior of College Women in 1975, 1986, and 1989," *New England Journal of Medicine*, 322:824, 1990.

[†]Ibid., p. 821.

DIGEST

Emotional Support, Cognitive Stimulation at Home Improve Outlook for Children of Teenage Mothers

Offspring of teenage mothers appear less likely to develop behavioral and academic problems if they have received emotional support and cognitive stimulation at home.¹ Research assessing the personal and family characteristics, social adjustment and academic performance of more than 700 school-age children born to adolescent mothers shows that poverty and low, maternal self-esteem, on the other hand, are significantly linked to subsequent behavioral difficulties among such children, while urban residence and low maternal education are associated with lower academic achievement. Children who face a larger number of socioeconomic risk factors are more likely to encounter behavioral and academic difficulties. However, even children with a large number of risk factors appear to benefit from emotional support and cognitive stimulation. The researchers conclude that efforts to enhance the educational and employment prospects of teenage mothers and the self-esteem of the mothers and their children may reduce the negative effects of adolescent childbearing.

The data were taken from a subset of the merged mother-child data set of the National Longitudinal Survey of Youth (NLSY), a national sample of 6,284 women aged 14-21 who were first interviewed in 1979. The merged mother-child data set includes information about 5,876 children born to 3,322 of the women from the original sample; in 1986, more than 90 percent of the mothers were reinterviewed and more than 90 percent of the children were assessed. The investigators focused on 721 children aged 8-15 (mean age, 9.8) who were born to teenage mothers and about whom the necessary information was available in 1986.

The children's behavioral adjustment was rated by mothers' responses to the Behavior Problems Checklist, a 28-item scale

that measured characteristics such as antisocial behavior (measured separately), hyperactivity, depression, and conflict with peers. Academic achievement was evaluated by the children's performance on the mathematics, reading recognition and reading comprehension sections of the Peabody Individual Achievement Test.

The researchers examined seven factors expected to put the children at risk of behavioral or academic problems: absence of a father figure from the home, crowding (four or more children living in the home), urban residence, family income below poverty level, maternal education of less than 12 years, a mother who was younger than 17 when the child was born, and low maternal self-esteem (evaluated in 1980). Factors expected to protect the children from subsequent problems included the child's verbal intelligence (assessed by his or her performance on the Peabody Picture Vocabulary Test) and self-esteem (rated by the self-worth subscale of Harter's Perceived Competence Scale for Children). In addition, during home visits conducted in 1986, trained interviewers obtained an index of the quality of stimulation provided in the home by using the elementary school version of Home Observation for Measurement of the Environment. Emotional support and cognitive stimulation were rated separately, using two general subscales with 13 and 14 items, respectively.

Fifty-nine percent of the sample were members of minority groups, 47 percent lived in poverty and 73 percent lived in an urban area. In addition, 59 percent of the mothers had less than a high school education, 47 percent were younger than 17 when the study child was born, 42 percent had no spouse and 20 percent had four or more children at home. Overall, the children ranked below average in the intelligence measure and above average in total

behavior problems and antisocial behavior. Even so, they performed within the average range on mathematics and reading achievement tests.

Only four percent of the children had no risk factor, while 14 percent had only one, 17 percent had two, 22 percent had three, 21 percent had four, 14 percent had five and eight percent had 6-7 risk factors. Each of the seven factors was modestly related to the three achievement-test scores and to the antisocial behavior subscale of the Behavior Problems Index, while five were related to the Behavior Problems Index total score.

Three of the risk factors were significantly related to an increased risk of difficulty in all behavioral and academic categories: poverty, low maternal self-esteem and a mother who was younger than 17 when the child was born. Multiple regression analysis showed that poverty and low maternal self-esteem were associated with increased risk of behavior problems, while urban residence and mother's level of education were associated with low mathematics scores and poor reading recognition and comprehension. In addition, the child's risk of having academic or behavioral problems increased as the number of risk factors increased: Twenty-two percent of children with no risk factors demonstrated antisocial behavior, compared with 66 percent of those with three or more risk factors. Similarly, the proportion of children with deficiencies in mathematics, reading recognition or reading comprehension rose from 10 percent or less among those with no risk factors to more than 40 percent among those with three or more.

The researchers also found that children with high ratings for any of the four hypothesized protective factors—intelligence, self-esteem, emotional support or cognitive stimulation in the home—were significantly less likely than other children

to experience behavioral and academic difficulties. Among children who had been exposed to at least one risk factor, emotional support at home was associated with fewer behavior problems, and both emotional support and cognitive stimulation were associated with fewer academic problems. Above average intelligence protected at-risk children from academic difficulties, while high self-esteem appeared to prevent antisocial behavior as well as academic problems.

The study suggests that although children of teenage mothers are at greater risk of behavioral and academic problems, some children overcome these risks because of the presence of specific protective factors. The researchers note that they did not assess other variables that may have influenced outcomes, such as the quality of the schools or children's involvement with other supportive adults or peers. However, their results indicate that providing educational support and employment training to adolescent mothers and offering supportive services to the mothers and their children (including parenting education and programs that enhance self-esteem) may help improve the children's social adjustment and academic performance.—M. Witwer

Reference

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As Incidence of Syphilis Rises Sharply in the U.S., Racial Differentials Grow

After decreasing between 1981 and 1985, the incidence of primary and secondary syphilis in the United States increased sharply; by 1989, it had reached its highest level in 40 years, according to an analysis of data on new cases reported to the Centers for Disease Control (CDC).¹ Racial and ethnic differentials grew throughout the decade: The black-to-white incidence ratio more than tripled, reflecting large increases among blacks and large decreases among whites. The Hispanic-to-white ratio almost doubled over the same period. Gender differentials, however, decreased in all racial and ethnic groups, indicating that women's risk of contracting syphilis was increasing more rapidly than men's risk.

Data on new cases of syphilis from quarterly and annual summaries provided by state health departments to the CDC between 1981 and 1989 were broken down

by gender, stage of the disease and source of report (public, private or military); the annual summaries also categorized the cases by racial or ethnic group* and age-group. These data were analyzed to detect recent trends in incidence of syphilis. Cases of early latent syphilis (duration of less than one year) were omitted because data on race were not available and because trends in that stage of the disease paralleled those in the primary and secondary stages. Cases among military personnel were also excluded, and cases reported by private and public sources were combined for most of the calculations.

Age-specific incidence rates were calculated by five-year age-groups for men and women 10-44 years old and by 10-year age-groups for those 45-64 years old, while those 65 or older made up one age-group. Calculations for the United States overall were based on Census Bureau population estimates for 1981 through 1989; those for individual states and cities were based on Census Bureau estimates and on age-specific, race-specific and gender-specific intercensal population estimates.[†]

The incidence of syphilis in the United States declined from 14.6 cases per 100,000 to 11.4 cases per 100,000 between 1982 and 1985, then rose during the next four years. In 1989, incidence reached 18.4 per 100,000, the highest level since 1949. Racial and ethnic differentials grew larger during the 1980s. Rates among white men, for example, peaked in 1982 at 10.3 cases per 100,000, then fell to 3.2 per 100,000 by 1989. In contrast, among black men, incidence decreased between 1982 and 1985 from 101.9 per 100,000 to 71.5 per 100,000, but rose between 1985 and 1989 by 106 percent, to 147.4 per 100,000. Among black women, rates initially fell from 45.8 per 100,000 to 35.8 per 100,000, but climbed disproportionately between 1985 and 1989 (by 176 percent) to 98.7 cases per 100,000.

Rates among Hispanic men remained essentially stable between 1981 and 1987, but fell sharply between 1987 and 1989 (from 43.3 to 27.3 cases per 100,000). Among Hispanic women, incidence rose from 8.1 cases per 100,000 in 1981 to 13.7 per 100,000 in 1988, then decreased to 10.0 per 100,000 in 1989. Trends among Asians and Pacific Islanders were similar to those among whites. Rates among American Indian and Alaskan native men were somewhat higher than those among white men, but showed much the same pattern, decreasing from a peak of 21.4 cases per 100,000 in 1983 to 4.9 per 100,000 in 1989. There were fewer than 100 cases of syphilis per year among American Indian and

Alaskan native women, and no pattern of change was evident.

Gender differentials decreased in all racial and ethnic groups between 1981 and 1989. Male-to-female incidence ratios fell from 7.9 to 1.6 among whites, from 6.4 to 2.7 among Asians and Pacific Islanders, from 4.4 to 2.5 among Hispanics, from 2.2 to 1.3 among American Indians and Alaskan natives and from 2.3 to 1.5 among blacks.

Age-specific incidence patterns changed little during the 1980s, with rates among men highest at ages 20-39 and those among women highest at ages 15-34; this was the case for all racial and ethnic groups. The decreases in the incidence of syphilis among white men and men of "other" races were similar in all age-groups. Among black men, however, the magnitude of change varied by age. The decreases in the first half of the decade were largest among 15-24-year-olds and smallest among those older than 40, and the increases during the second half of the decade were larger among men older than 30. The incidence of syphilis remained low among white women, with little change in any age cohort. Among black women, large, proportionate increases occurred in all age-groups between 15 and 54. Trends among Hispanic women showed little variation by age-group between 1981 and 1989; incidence increased in all age-groups between 15 and 45, despite the downward trend at the end of the decade.

Regional patterns of syphilis rates changed little between 1981 and 1989: In both years, incidence was lowest in the Midwest and highest in the South. However, the differential between states increased sharply, with the lowest rates remaining below one case per 100,000 population and the highest rising from 38 to 60 cases per 100,000. This pattern did not change substantially when the state rates were adjusted to the racial composition of the United States overall, although the disparity between the South and the rest of the country was reduced.

*Racial and ethnic categories included non-Hispanic black, non-Hispanic white, Hispanic, Asian/Pacific Islander and American Indian/Alaskan native. Because of the small numbers of cases in the last two groups, they were combined into an "other races" category for analyses of age-specific incidence rates.

†The racial categories in the state and city estimates were white, black and other races. Estimates for the Hispanic population were not available at the state or city level for the years included in the study. Because most Hispanics would be categorized as white, cases of syphilis among Hispanics were combined with those among whites for calculations of race-adjusted state incidence rates.

DIGEST

The investigators suggest that changes in sexual behavior in response to the human immunodeficiency virus (HIV) epidemic may have had an impact on the incidence of syphilis and on the rate differentials among subpopulations. In 1982, 71 percent of reported syphilis cases among white men whose sexual orientation could be determined (59 percent of all cases) and 35 percent of the cases among black men

whose sexual orientation could be determined (72 percent of all cases) were among homosexuals or bisexuals. Thus, a decrease in incidence among homosexual and bisexual black men would affect overall rates among black men less than a comparable decrease among homosexual and bisexual white men would affect overall rates among white men.

Although the decrease in the incidence of syphilis among black women during the early 1980s suggests that changes in sexual behavior occurred among black heterosexuals as well as homosexuals and bisexuals during that period, the increases among black men and women since 1985

provide evidence that these changes may not have been lasting. Noting that HIV has already "disproportionately affected urban minority groups because of intravenous drug use-related transmission," the authors conclude that "the implications [of these results] for increased sexual transmission of HIV in this population are substantial. This is especially true since genital ulceration seems to facilitate sexual transmission of HIV."—F. Althaus

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An Adolescent's Age and Her Parents' Education Affect How She Resolves Unintended Pregnancy

A teenager's decisions about an unintended pregnancy—whether to carry it to term and, if she does, whether to marry to legitimate the birth—are strongly affected by her parents' level of education, and less so by a variety of other factors.¹ Regression analyses of nationally representative data indicate that regardless of race or ethnicity, the likelihood that a premaritally pregnant teenager would have an abortion is substantially increased if her parents have more than a high school education. A white teenager's probability of having an abortion is also raised if she was under age 16 when she conceived, and her likelihood of having an out-of-wedlock birth is increased if she is from a female-headed household or if her parents had less than a high school education.

A Teenager's Choice

An unmarried teenager faced with a pregnancy can either terminate the pregnancy or carry it to term and then put the child up for adoption, marry to legitimate the birth or remain unmarried and raise the child. However, certain background factors may predispose teenagers to make one choice over another. Data from 1,946 respondents to the annual National Longitudinal Surveys of Work Experience of Youth (NLSY) for 1979–1986 whose first pregnancy occurred before age 24 and between February 1973 and April 1985 were recently analyzed to examine this issue.

In general, blacks were more likely than whites or Hispanics to have become premaritally pregnant, while young women from intact families and those with few siblings were less likely. Overall, 52 percent of the respondents selected for inclusion in the analysis had had an out-of-

wedlock birth, 22 percent had married before childbirth and 26 percent had obtained an abortion.

A conditional logistic regression was used to examine three of the four choices—abortion, nonmarital childbearing and marriage to legitimate the birth—with an emphasis on the impact of family background factors. (Adoption was not analyzed because so few study participants chose to put their newborns up for adoption.) Because preliminary analyses indicated that race and ethnicity strongly influence pregnancy outcome, the regression model was run separately for Hispanics, blacks and non-Hispanic whites.

The findings indicate that the factors determining pregnancy resolution differ greatly by race or ethnicity. Parental education has the most uniform effect. Among whites and Hispanics, young women whose parents had at least 12 years of education were significantly less likely than those with less-educated parents to have chosen either out-of-wedlock childbirth or legitimation of the birth over termination of the pregnancy. The same pattern held among blacks, but emerged only among those whose parents had more than a high school education.

Among Hispanics, parental education is the only background characteristic to have had a significant effect. Age at conception and number of siblings are additional significant factors among both blacks and whites, but not always in the same way: Whites who conceive at ages 16–17 are much more likely than those younger than 16 to choose legitimation over abortion or out-of-wedlock childbearing, while among blacks, it is not until ages 18–19 that young women are more likely than those under

age 16 to choose legitimation over abortion or out-of-wedlock childbirth. Young white women and young black women with five or more siblings are significantly more likely than those with two or fewer siblings to choose out-of-wedlock childbearing over abortion; whites with five or more siblings are also more likely than those with two or fewer to choose out-of-wedlock childbearing over legitimation.

A number of other factors emerge as significant predictors of white teenagers' decision-making. Only among whites, for example, are young women from female-headed households significantly more likely than those from intact households to choose out-of-wedlock childbirth over abortion or legitimation. Finally, young white women whose mothers work are less likely than those whose mothers do not work to choose legitimation over abortion.

Probabilities of Various Outcomes

The investigator also determined the probabilities with which whites, blacks and Hispanics having certain baseline characteristics would bear a child out of wedlock, marry to legitimate a birth or terminate the pregnancy, and then examined the degree to which that probability changes if a young woman's background characteristics are altered.

For example, a white 16–17-year-old whose parents graduated from high school, who is from an intact family that is not Catholic or fundamentalist Protestant, who has 3–4 siblings and who has a working mother would be more likely to have a legitimated birth (a probability of .413) than an abortion (.352) or an out-of-wedlock birth (.235). However, if that same young woman were from a female-headed

family rather than from an intact family, she would be more likely to have an out-of-wedlock birth (.390) than an abortion (.316) or a legitimated birth (.294). On the other hand, if the young woman were under age 16 at the time of conception, her likelihood of obtaining an abortion would be substantially higher (.463), her probability of having an out-of-wedlock birth would be slightly greater (.300) and her likelihood of marrying to legitimate the birth (.236) would be correspondingly lower. Having parents with more than a high school education substantially increases the likelihood that the young woman would terminate the pregnancy (.565) and decreases the probability that she would marry to legitimate the birth (.286) or bear a child out of wedlock (.149).

The differentials among blacks as a result of varying background characteristics are less substantial than those among whites. The base case among blacks is defined as a 16-17-year-old whose parents did not graduate from high school, who is from an intact fundamentalist Protestant family, who has five or more siblings and who has a working mother. Such a young woman would be far more likely to have an out-of-wedlock birth (.837) than to terminate the pregnancy (.099) or marry to legitimate the birth (.062). However, if that young woman's parents have more than a high school education, her probability of having a nonmarital birth is considerably reduced (.673) and her likelihood of obtaining an abortion increased (.273).

Evaluation of the effects of background factors among Hispanics is difficult because of the relatively smaller number of Hispanics among the NLSY respondents. The baseline case among Hispanics is a 16-17-year-old whose parents did not graduate from high school, who is from an intact Catholic family, who has five or more siblings and who has a nonworking mother; such a young woman is more likely to have an out-of-wedlock birth (.577) than to legitimate the birth (.322) or have an abortion (.100). However, should that young woman have parents who graduated from high school, the probability of a nonmarital birth is only slightly reduced (.522), while the probability of an abortion is increased (.255) and the probability of legitimation is decreased (.223). If the young woman's parents have some post-high school education, abortion becomes the most likely choice (.405), while the probability of an out-of-wedlock birth is substantially reduced (.342) and the probability of legitimation is slightly lessened (.252).

The investigator concludes that "the effect of parental education is particularly strong and is pervasive regardless of race/ethnicity." She suggests that the more educated a young woman's parents are, "the more likely the girl herself is to value her own education and acknowledge that having a baby would interfere with the completion of schooling."—M. Klitsch

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Young Adults Choose Alternatives to Marriage, Remain Single Longer

Continuing a trend that began in the late 1950s and intensified in the mid-1970s, an increasing number of young adults in the United States are postponing or forgoing marriage, and many of them are remaining with their parents or are setting up households as unmarried couples. According to statistics published by the U.S. Bureau of the Census, the median age at first marriage for both men and women has reached the highest level since such data were first recorded in 1890.¹ These and other data suggest a continued movement away from the nuclear family: Only three in four children under age 18 are living with both parents, and half of noninstitutionalized persons 85 or older are living alone.

Marriage

Between 1970 and 1989, the estimated median age at first marriage (the age by which half of all persons who will ever marry have done so) rose by three years for both men and women, to 26.2 years and 23.8 years, respectively. These are the highest levels since statistics on age at marriage were first recorded. The median age for men was at its highest previous level in 1890 (26.1 years); it fell during the first half of this century, but has risen steadily since 1955. The median age at which women marry has followed a similar pattern, rising slowly from a low of 20.2 in 1955 and then increasing rapidly after 1975.

Reflecting the rise in age at first marriage, the proportions of young men and women who had never married increased sharply between 1970 and 1989. Among women, 63 percent of 20-24-year-olds, 29 percent of 25-29-year-olds and 17 percent of 30-34-year-olds had never been married at the time the 1989 data were collected; among their counterparts in 1970, those figures were 36 percent, 11 percent and six percent. Only among women 55 or older was this pattern reversed.

In 1989, 77 percent of men aged 20-24 had never married, compared with 55 percent in 1970; those proportions were 46 percent and 19 percent, respectively, for 25-29-year-olds, and 26 percent and nine percent, respectively, for 30-34-year-olds. Thus, between 1970 and 1989, the proportions of men and women aged 20-24 who had never been married increased by 41

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DIGEST

percent and 75 percent, respectively. Among 25-29-year-olds, the probability of never having been married was twice as high for men in 1989 as in 1970, and three times as high for women. Among 30-34-year-olds, the probability of never having been married tripled during that period for both men and women.

Living Arrangements

In 1989, 13.4 million 18-24-year-olds and nearly five million 25-34-year-olds were living with their parents. Men marry and leave their parents' home later than do women: Among 18-24-year-olds, 58 percent of men and 47 percent of women lived with their parents, and among 25-34-year-olds, those proportions were 15 percent and eight percent, respectively. Nearly three in 10 women in the latter age-group had children of their own living with them in their parents' household.

More than five times as many unmarried couples were cohabiting in 1989 as in 1970 (2.8 million vs. 523,000); in 1989, there were children present in 31 percent of those households. Almost 60 percent of the cohabiting men and women had never been married, 32 percent were divorced, five percent were separated and four percent were widowed. Overall, 27 percent were 24 or younger, 42 percent were 25-34 years old and 17 percent were 35-44 years old.

As the numbers of divorces, separations and out-of-wedlock births continue to rise, decreasing proportions of children under age 18 are living with two parents. Between 1970 and 1989, the proportion living with two parents declined from 85 percent to 73 percent, and the proportion living with one parent rose from 12 percent to 24 percent. (The proportion of children living with neither parent has remained at about three percent since 1960.) White children were more than twice as likely as black children to be living with two parents (80 percent vs. 38 percent); 67 percent of Hispanic children (who may be of any race) were living in two-parent households. In the 1970s, the proportion of children living with two parents fell by 28 percent among blacks and by eight percent among whites; in the 1980s, this decrease slowed to 10 percent and four percent, respectively.

The primary reasons why children were living with only one parent in 1989 have changed little since 1986, but show an in-

tensification of trends that appeared in the 1970s. Among children living with a single parent in 1989, the largest proportion lived with a parent who was divorced (39 percent), followed by those whose parent had never been married (31 percent), was either separated (20 percent) or living apart from a spouse for other reasons (three percent), or was widowed (six percent).

Of 15.5 million children living with only one parent in 1989, 13.7 million were living with their mother. In these households, the mean annual income was approximately \$15,700, compared with about \$26,700 for father-only households and \$42,500 for two-parent families. Census Bureau analysis indicates large economic differences between races: Among single mothers, whites had a higher mean annual income than blacks (\$17,400 vs. \$12,900) and were more likely to have an annual income above the poverty level (56 percent vs. 36 percent), although they were only slightly more likely to have finished high school (69 percent vs. 66 percent).

The living arrangements of the noninstitutionalized elderly varied by age and sex. In 1989, among those aged 65-74, 63 percent lived with their spouse, 25 percent lived alone and 10 percent lived with relatives. Among those 85 or older, however, the proportion living with their spouse was far smaller (22 percent), while the proportion living alone was nearly twice as large (47 percent) and the proportion living with relatives was almost three times as large (28 percent). The living arrangements of men were fairly stable up to age 85: Among those aged 65-84, 76 percent lived with their wife, 15 percent lived alone and seven percent lived with relatives. Among those aged 85 or older, however, the proportion living with their wife fell substantially (to 48 percent), while both the proportion living alone and the proportion living with relatives more than doubled (to 33 percent and 18 percent, respectively). Women's living arrangements changed significantly across the three age-groups: The proportion living with their husband fell from 51 percent of 65-74-year-olds to 28 percent of 75-84-year-olds and nine percent of those 85 or older, while the proportion living alone rose from 34 percent among women aged 65-74 to 51 percent of those aged 75-84 and 54 percent of those 85 or older; the proportion living with relatives rose from 14 percent and 19 percent to 33 percent across those age-groups.—F. Althaus

Reference

1. A. F. Saluter, "Marital Status and Living Arrangements: March 1989," *Current Population Reports*, U.S. Bureau of the Census, Series P-20, No. 445, 1990.

One-Third of Working Mothers of a School-Age Child Pay for Day Care

More than half of preschool-age children in the United States with working mothers were cared for in their own homes or in someone else's home during fall 1987; however, a smaller but growing percentage attended day-care and group-care centers or nursery schools and preschools.¹ According to data from the U.S. Survey of Income and Program Participation (SIPP), one-third of employed mothers with children under 15 paid for child care during 1987, and this payment averaged nearly \$50 per week; thus, these women spent about seven percent of their monthly family income on child care, an estimated yearly expenditure of \$15.5 billion.

The SIPP, a prospective Census Bureau survey on the economic situation of U.S. households and persons, interviews respondents at four-month intervals over a two-and-one-half-year period. The following data are from the September-November 1987 reference period, for which subgroups of the 1986 and 1987 samples were interviewed. Information on child care was collected only for the three youngest children under 15 in the surveyed family. The report provides data representative of the 28.8 million children living with employed mothers in fall 1987. In addition, it provides information on the 1.4 million children whose mothers were enrolled in school during this time and the 1.9 million children under 15 living with fathers or male guardians who were either employed or enrolled in school during the survey period.

Who Takes Care of the Children

Seventy-one percent of the 19.7 million school-age children (aged 5-15) of employed mothers were in kindergarten or grade school while their mothers were at work. Many of the remaining 29 percent were also in school, but their school hours did not coincide with their mothers' work hours. Nearly half of these children were cared for in their own home, and half of these by their fathers; in addition, about four percent were left at home unsupervised while their mothers worked.

Of the 9.1 million U.S. children under age five, 30 percent were cared for in their own homes (mainly by their fathers), 36 percent in another home (most often by a nonrelative), 24 percent in an organized child-care facility and nine percent by their mother while she was working, either at home or elsewhere.

Of the 1.5 million infants whose mothers were employed, 70 percent were cared for in their own home or in another home, 12 percent in day-care or group-care centers and two percent in nursery schools or preschools; the remaining 16 percent were cared for by their mother while she worked. Among the 3.8 million 1-2-year-olds, these proportions were 74 percent, 15 percent, four percent and eight percent. However, among 3-4-year-olds, the proportion cared for at their own or someone else's home fell to 56 percent, while the proportions attending day-care or nursery school rose to 19 percent and 15 percent, respectively.

Of the nine million women whose children under 15 were cared for by someone else while they worked, seven percent said they had lost some time from work in the last month because of a failure in child-care arrangements.

About eight million children of employed mothers (including 12 percent of preschool-age children and 35 percent of school-age children) received more than one form of child care. The report used "secondary child care" to refer to the arrangement used second most frequently during a respondent's typical work week. Children over age five whose primary form of care was kindergarten or grade school made up 75 percent of those for whom secondary arrangements were necessary while their mothers were at work. The most frequently mentioned secondary location for children with two forms of child care was the child's home after school (38 percent); around 25 percent were cared for secondarily in someone else's home, another 10 percent attended some organized facility, and an additional 22 percent looked after themselves while their mothers were at work.

In fall 1987, it is estimated, there were 1.2 million children under 15 whose mothers were in school themselves. Thirty-six percent of the children were in kindergarten or grade school at the same time their mothers were in school. Of the 569,000 such children under age five, 41 percent were cared for in their own home (half of these by their fathers) and 21 percent in some sort of facility.

Among the 1.4 million school-age children living with their fathers but not with their mothers, 71 percent attended school while their fathers worked. In addition, about 470,000 preschool-age children lived with their fathers; 39 percent were cared for in organized child-care facilities, while 19 percent were cared for by their mothers, who lived elsewhere.

Who Uses Organized Care

Children under five whose mothers were employed full time were more likely than those whose mothers worked part-time to attend group-care or day-care centers (19 percent vs. 11 percent) or nursery schools or preschools (nine vs. seven percent). Children of employed mothers whose family income was higher than \$45,000 per year were twice as likely to receive organized child care (34 percent) as were children of mothers whose family income was less than \$15,000 per year (16 percent). Roughly 15 percent of children living in families at or near the poverty level received organized child care, compared with 25 percent of children in families that were not poor. Children whose mothers had completed at least one year of college were twice as likely to receive organized child care (29 percent) as were children whose mothers had not completed high school (15 percent).

Of the 18.5 million employed women with children under 15 years old, 33 percent said they made a cash payment for child care for at least one of their children. These payments averaged \$49 per week and amounted to an estimated annual

expenditure of \$15.5 billion. The average monthly family income of women who paid for child care was around \$3,200, so these payments represented seven percent of their income. Between 53 percent and 59 percent of women with preschool-age children made cash payments for child care, compared with only 16 percent of mothers with school-age children. Women with preschoolers paid \$51-\$58 dollars a week and spent 7-8 percent of their income on child care, while women with older children paid only \$35 per week and spent about five percent of their income.

About eight percent (one million) of the employed women with children under age 15 years old in fall 1987 were living in poverty. Approximately one quarter of these women reported making a cash payment for child care, compared with one-third of women classified as not poor; however, those who were in poverty spent one-quarter of their income on child care, compared with six percent among those who were not poor.—R. Turner

References

1. U.S. Bureau of the Census, "Child Care Arrangements: Winter, 1986-87," *Current Population Reports*, Series P-70, No. 20, 1990.

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DIGEST

Papillomavirus Infection Among Factors That May Raise Vulvar Cancer Risk

The incidence of vulvar cancer, a relatively rare carcinoma, may be related to women's exposure to human papillomaviruses, their history of cigarette smoking and their lifetime number of sexual partners.¹ A case-control study conducted by the National Cancer Institute reveals that women who have had five or more sexual partners are nearly three times as likely to develop vulvar cancer as women who have had one partner or none; in addition, women who have a history of genital warts, who have had an abnormal cervical smear or who smoke are at increased risk. Smokers with a history of genital warts had a risk of vulvar cancer 35 times greater than that of nonsmokers with no such history.

As part of a wider study of rare reproductive cancers, the researchers collected data on vulvar cancer from 10 hospitals in Chicago and 24 in upstate New York. Starting in February 1986, hospital records for the preceding 12 months were examined, and patients over the next 18 months were monitored to identify newly diagnosed cases of vulvar cancer for study. To be eligible for inclusion in the analysis, women had to be 20-79 years of age, to live in the hospital's catchment area and to have received no previous hospital treatment for their cancer.

A total of 344 cases of vulvar cancer were identified and were confirmed pathologically. The investigators then selected two controls for each cancer patient, matched by age, race and area of residence; controls under age 65 were chosen by random-digit dialing, while older controls were selected from lists maintained by the Health Care Financing Administration. Cases and controls were interviewed at home and asked about their pregnancy and menstrual history, sexual and contraceptive behavior and marital, smoking and family history. Completed interviews were obtained for 61 percent of the 344 cases and for 51 percent of the 686 controls.

The age-adjusted relative risk of vulvar cancer rose steadily with the women's lifetime number of sexual partners: Compared with women who had had one or no partner (1.00), those with two lifetime sexual partners had a risk of vulvar cancer of

1.68, those with 3-4 partners had a risk of 2.81, those with 5-9 partners had a risk of 3.80 and those with 10 or more lifetime partners had a risk of 2.85. When these data were adjusted to control for the effects of a previous abnormal Papanicolaou smear, a history of genital warts and current cigarette smoking, the relative risks declined somewhat, but they remained statistically significant among those with 3-4 lifetime partners (2.59) and 5-9 partners (2.84). An increased relative risk of cancer among women who first had intercourse before age 18 disappeared when the investigators adjusted for number of sexual partners. Age at menarche and menstrual regularity were not related to the risk of vulvar cancer.

There was no association between number of pregnancies and cancer risk, nor between oral contraceptive use and vulvar cancer. The relative risk was lower among users of barrier methods, but this reduction was not statistically significant. Women who had had an abnormal Pap smear had a risk of 1.8 relative to women with a normal Pap smear, and the risk was particularly increased among those with several abnormal smears. Personal hygiene (for example, frequency of douching) was not associated with the risk of vulvar cancer. Although women who used tampons were significantly less likely to develop vulvar cancer (relative risk of 0.5), there was no relationship between cancer risk and regularity of tampon use, age at first or last use, or consistency of use.

Current smokers were 2.0 times as likely as those who had never smoked to develop vulvar cancer, and current smokers who began smoking before age 17 had a relative risk of 2.8. Although a history of any sexually transmitted disease was associated with a slightly increased relative risk, it was not statistically significant. However, women who reported having had genital warts were 15 times as likely to develop vulvar cancer as those who had never had such warts, and those who had had repeated episodes of genital warts were 36 times as likely to develop vulvar cancer. The only substantial interaction between risk factors was between a history of genital warts and smoking: Women who had ever smoked and who had ever had genital warts were 35 times as likely to develop vulvar cancer as those who had never smoked and had never had warts.

The investigators observe that genital warts are caused by a different human papillomavirus (HPV) than has usually been found in vulvar cancers; the association between the two may "reflect a com-

mon mode of transmission for different types of HPV infection or [some women's] increased susceptibility to multiple HPV types." They also note that cigarette smoking has already been implicated in the risk of cervical cancer, and that vulvar cancer often occurs simultaneously with cervical cancer. "Our findings support the notion," they conclude, "that expression of abnormalities in the cervical epithelium may be a marker for subsequent vulvar cancer, particularly when multiple abnormal [Pap] smears occur." They warn, however, that their response rates were low, that vulvar cancer is relatively rare, and that with a few exceptions the increased risks were small. "Thus," the researchers comment, "these findings must be considered tentative until further confirmation."—M. Klitsch

Reference

1. L. A. Brinton et al., "Case-Control Study of Cancer of the Vulva," *Obstetrics & Gynecology*, 75:859, 1990.

Letters from Readers

(Continued from page 41)

condom use; they believe it is a sign that their culture and their peers are becoming more comfortable with human sexuality and therefore with measures that prevent pregnancy and sexually transmitted diseases. Students, too, know there is still room for improvement but are not so naive as to expect that the rate will ever get close to 100 percent.

Toby Simon, director, Health Education
Marlene Eckerle, codirector, Health Services
MaryLou McMillan, health educator
Brown University
Providence, R.I.

Editor's Note:

The two figures cited by Toby Simon and her colleagues resulted from two different survey questions, one of which probed use of condoms for pregnancy prevention and one of which probed condom use for protection against STDs. The first question asked women to name their usual (or regular) method of contraception; in 1989, 25 percent of the sexually experienced health service clients reported that the condom was their usual method. To the second question, "When you have intercourse, how often does your partner use a condom?" (italics added) 41 percent of the sexually active women responded "always" or "almost always" in 1989.

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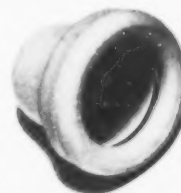
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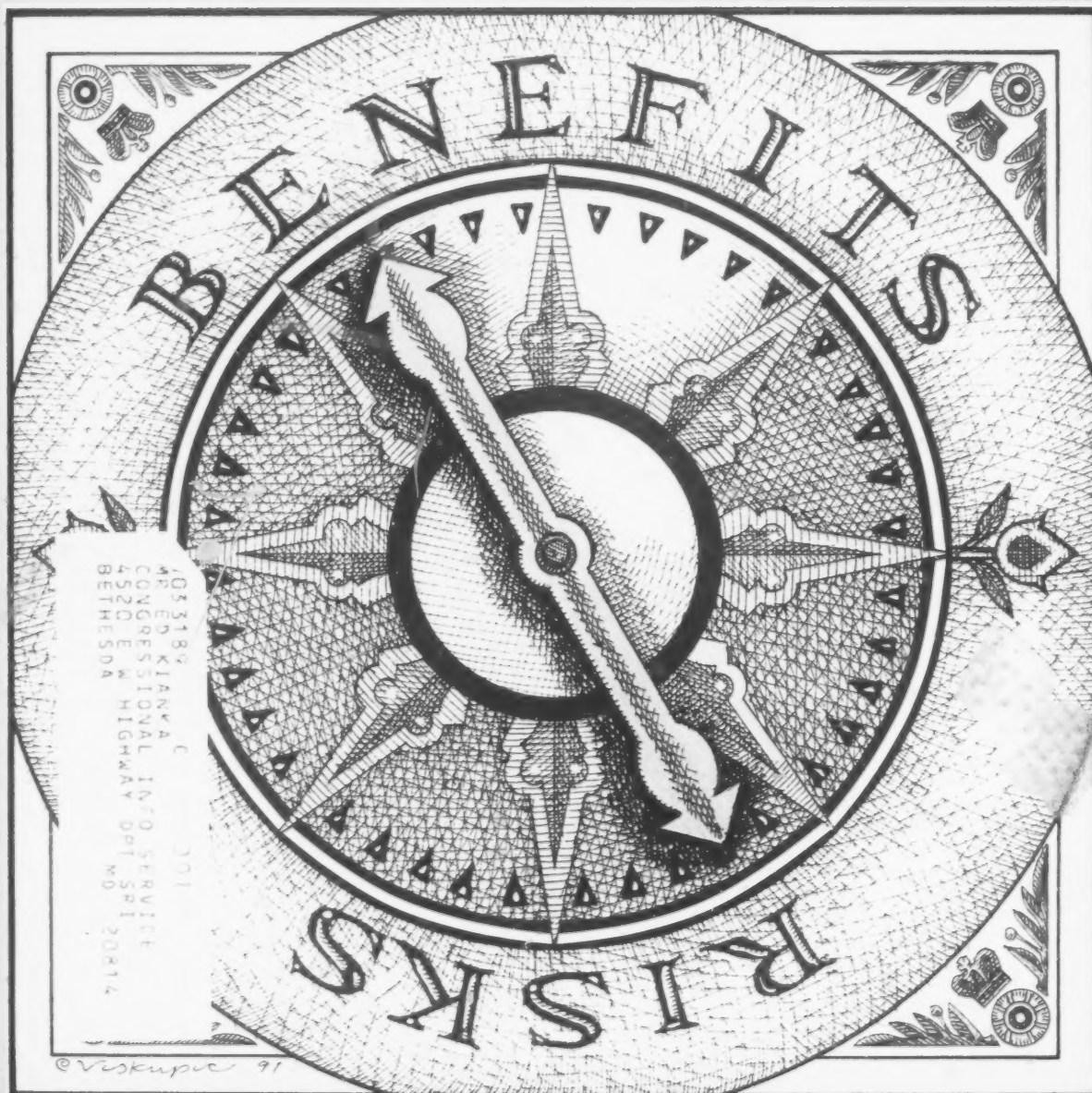
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Family Planning Perspectives

Volume 23, Number 2, March/April 1991

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Consistency of Contraceptive Use in Married Couples

Risks and Benefits of Contraceptive Choices



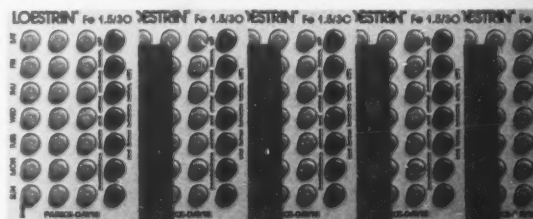
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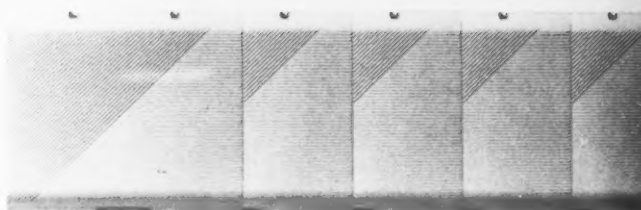
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Reference 1. Data on file, Medical Affairs Dept, Parke-Davis.

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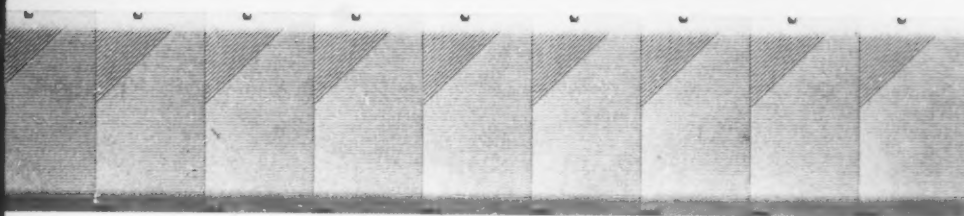
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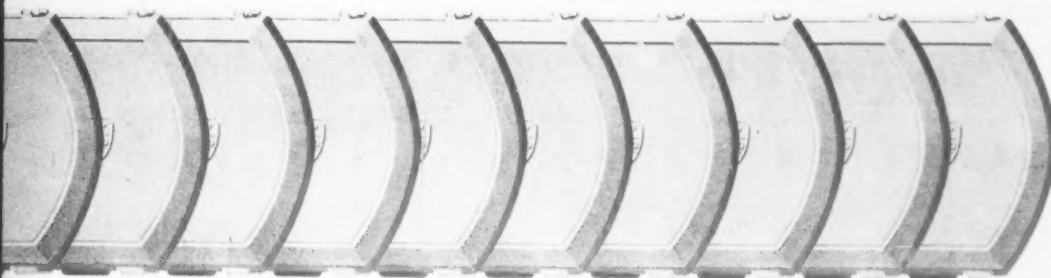
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Before prescribing, please see full prescribing information. A Brief Summary follows.

INDICATIONS AND USAGE: Lanthan 21 and Lanthan Fe are indicated for the prevention of constipation.

CONTRAINDICATIONS: ODS should not be used in women who currently have the following conditions: 1. Thrombophlebitis or thromboembolic disorders. 2. A past history of deep vein thrombophlebitis or thromboembolic disorders. 3. Cerebral vascular or coronary artery disease. 4. Known or suspected carcinoma of the breast. 5. Carcinoma of the endometrium or other known or suspected estrogen-dependent neoplasia. 6. Undiagnosed abnormal genital bleeding. 7. Cholestatic jaundice of pregnancy or jaundice with prior pill use. 8. Hepatic adenomas or carcinomas. 9. Known or suspected pregnancy.

Cigarette smoking increases the risk of serious cardiovascular side effects from oral contraceptive use. This risk increases with age and with heavy smoking (15 or more cigarettes per day) and is quite marked in women over 35 years of age. Women who use oral contraceptives should be strongly advised not to smoke.

The use of OCs is associated with increased rates of several serious conditions including myocardial infarction, thromboembolism, stroke, hepatic neoplasia, and gallbladder disease, although the role of venous thrombosis, in particular, is very small in healthy women without underlying risk factors. The role of morbidity and mortality increases significantly in women with underlying risk factors such as hypertension, diabetes, obesity, and smoking. The use of OCs in these high-risk populations should be taken into account in the design of clinical trials. The use of OCs in these high-risk populations is the principal basis for the studies carried out in patients who used OCs with higher formulations of estrogens and progestagens than those in common use today. The effect of long-term use of the OCs with lower formulations of both estrogens and progestagens remains to be determined. Through this labeling, epidemiological studies reporting both the relative risk of disease among users of OCs and the absolute risk of disease among nonusers can be made. As a measure of the relative risk of a disease, namely a ratio of the incidence of a disease among OC users to that among nonusers. The relative risk does not provide information on the actual (absolute) occurrence of a disease. Cohort studies provide a measure of absolute risk, which is the number of individuals who develop a disease among a group of nonusers. Cohort studies are more difficult to conduct than case-control studies, and the actual number of individuals developing a disease for nonusers is often small.

Problems: 1. **Myocardial infarction:** An increased risk of thromboembolic infarction has been attributed to OC use. This is primarily in smokers or women with other underlying risk factors for coronary artery disease such as hypertension, hypercholesterolemia, morbid obesity, and diabetes. The relative risk of heart attack for current OC users has been estimated to be two to six times as high as for nonusers in the age of 35. Smoking in combination with OC use has been shown to contribute to the increased risk of myocardial infarction. The risk of stroke is also increased in women taking OCs. The risk of stroke for the majority of women takes. Mortality rates associated with cardiovascular disease have been shown to increase substantially in smokers over the age of 35 and nonsmokers over the age of 40 among women who use OCs. OCs may outbalance the effects of well-known risk factors, such as hypertension, diabetes, hyperlipidemia, age and obesity. In particular, some progestogens are known to decrease HDL cholesterol and cause glucose intolerance. Anti-thrombotic agents may create a state of hyperfibrinolysis. OCs have been shown to increase blood pressure among users (see section 9.1. **WARNINGS:** Smokers

[illegible]

prevascular events (thrombotic and hemorrhagic strokes) although the general risk is greater among older (> 55 years) hypertensive women who also smoke. Hypertension was found to be a risk factor for both strokes and nonstrokes for both types of strokes, while smoking interacted to increase the risk for hemorrhagic strokes. In a large study, the relative risk of thrombotic strokes has been shown to range from 3.3 for nonusers of oral contraceptives to 14.0 for users with severe hypertension. The relative risk of hemorrhagic stroke is reported to be 1.2 for nonusers who also used OCs, 2.6 for smokers who did not use OCs, 7.5 for smokers who used OCs, 18 for smokers who did not use OCs, and 23.7 for smokers with severe hypertension. The relative risk of stroke also increased with the amount of cigarette smoking.¹⁰

d. Dose-related risk of vascular disease from OCs. A positive correlation has been observed between the amount of estrogen and the risk of stroke.¹¹ A prospective study of 10,000 women found that a decline in serum high-density lipoprotein (HDL) has been reported with many progestational agents. A decline in serum high-density lipoproteins has been associated with an increased incidence of idiopathic heart disease. Because estrogens increase HDL cholesterol, the net effect of an OC depends on a balance achieved between doses of estrogen and progestogen, and the nature and absolute amount of progestogens used in the contraceptive. The amount of both hormones should be considered in the choice of an OC. Minimizing exposure to estrogen and progestogen is in keeping with good principles of pharmacology. For any particular estrogen-progestogen combination, the dosage regimen prescribed should be one which controls the menstrual cycle without excessive stimulation of ovarian activity, and is compatible with a low failure rate and the needs of the individual patient. Beneficial effects of OC therapy should be started as early as possible.

c. Persistence of risk of vascular disease: There are two studies which have shown persistence of risk of vascular disease for ever users of OCs. In a study in the United States, the risk of developing myocardial infarction after discontinuing OCs persists for at least 9 years for women 40–49 years who had used OCs for 5 or more years, but this increased risk was not demonstrated in other age groups. In another study in Great Britain, the risk of developing cerebrovascular disease persisted for at least 6 years after discontinuation of OCs, although excess risk was not seen until 12 months after stopping OCS. Both of these studies were performed in OC users who were not current smokers and did not have other risk factors for vascular disease.

2. Estimates of Mortality from Contraceptive Use: One study gathered data from a variety of sources which have estimated the mortality risk associated with different contraceptive methods. These estimates include the combined risk of death associated with contraceptive methods plus the risk attributable to pregnancy in the event of method failure. Each method of contraception has its specific benefits and risks. The study concluded that with the exception of OC users 35 and older who smoke and 40 and older who do not smoke, mortality associated with all methods of birth control is low and below that associated with childbirth. However, smokers 35 and older and non-smokers 40 and older who use OCs have an increase in mortality higher than those using other methods of birth control. These facts must be weighed in conjunction with failure rates for other methods and the risk associated with subsequent

Category 3. Carcinoma of the Reproductive Organs: Numerous epidemiological studies have been performed on the evidence of breast, endometrial, ovarian, and cervical cancer in women using OCs. The overwhelming evidence suggests that use of OCs is not associated with an increase in the risk of developing breast cancer. Results of the age and parity of first use of OCs in the Nurses' Health Study and the Nurses' Health Study II (NHSII) study also showed no latent effect on the risk of breast cancer for at least a decade following long-term use. A few studies have shown a slightly increased relative risk of developing breast cancer, although the methodology of these studies, which included differences in examination of users and nonusers and differences in age at start of use, has been questioned. Some studies suggest that OC use has been associated with an increase in the size of cervical intraepithelial neoplasia in some populations of women. However, these findings continue to be controversial about the extent to which such findings may

Due to differences in sexual behavior and other factors, in spite of many studies of the relationship between oral sex and breast and cervical cancers, a cause and effect relationship has not been established. **4. Hepatic Neoplasia** In a case-control study conducted in the United States, researchers found that men who had oral sex with a female partner had a 2.5-fold increase in the risk of developing liver cancer. Indirect calculations have estimated the attributable risk to be in the range of 13 cases/100,000 for oral sex, a risk that increases after four or more years of use. Rupture of liver benign hepatic nodules may cause death from intracranial hemorrhage. Studies from Britain have shown an increased risk of developing hepatocellular carcinoma in long-term (>5 years) drug users. However these cancers are extremely rare in the US. **5. Ocular Lesions.** There have been numerous case reports of retinal abnormalities associated with the use of OGCs. Ocular lesions have been reported to include conjunctival or complete loss of vision, onset of proptosis or diplopia, development of intraocular eye lesions. Acquired retinal degeneration

and therapeutic measures should be undertaken immediately. **6. OC Use Before or During Early Pregnancy: Risk of Birth Defects:** Extensive epidemiological studies have revealed no increased risk of birth defects in women who have

and OCs prior to pregnancy studies also do not suggest a teratogenic effect, particularly insofar as cardiac anomalies and limb reduction defects are concerned, when taken inadvertently during early pregnancy. The administration of OCs to induce abortion should not be used as a test for pregnancy. OCs should not be used during pregnancy to treat threatened or habitual abortion. It is recommended that, for any patient who has missed two consecutive periods, pregnancy should be ruled out before continuing OC use. If the patient has not adhered to the prescribed schedule, the possibility of pregnancy should be considered at the time of the first missed period. OC use should be discontinued if

7. Gallbladder Disease: Earlier studies have reported an increased lifetime relative risk of gallbladder surgery in users of OCs and estrogens. More recent studies, however, have shown that the relative risk of developing gallbladder disease among OC users may be minimal. The recent findings of minimal risk may be related to the use of

Effects: OCs have been shown to cause glucose intolerance in a significant percentage of users. OCs containing greater than 75 micrograms of estrogen cause hyperinsulinism, while lower doses of estrogen cause less glucose intolerance. Progestagens increase insulin secretion and create insulin resistance; this effect varies with different progestational agents. However, in the nondiabetic woman, OCs appear to have no effect on fasting blood glucose. Because of these demonstrated effects, prediabetic and diabetic women should be carefully observed while taking OCs. A small proportion of women will experience a decrease in blood glucose levels, while some will be able to discontinue their insulin therapy. In addition, the

9. Elevated Blood Pressure. An increase in blood pressure is a common side effect of OCS and may be accompanied by a decrease in blood volume. Data from the Royal College of General Practitioners and subsequent randomized trials have shown that the incidence of hypertension increases with increasing concentrations of progestogens. Women with a history of hypertension or hypertension-related diseases or renal disease should be encouraged to use another method of contraception. If women decide to use OCS, they should be monitored closely, and a significant elevation of blood pressure occurs, OCS should be discontinued. For most women, elevated blood pressure will return to normal after stopping OCS and there is no difference in the occurrence of hypertension among ever and never users.

11. Bleeding Irregularities: Breakthrough bleeding and spotting are sometimes encountered in patients on OCS, especially during the first three months of use. Nonnormal causes should be considered and adequate diagnostic measures taken to rule out malignancy or pregnancy in the event of breakthrough bleeding, as in the case of any abnormal vaginal bleeding. If pathology has been excluded, time or a change to another formulation may solve the problem. In the event of amenorrhea, pregnancy should be ruled out. Some women may encounter postpill amenorrhea.

and Follow-Up: A complete medical history and physical examination should be taken prior to the initiation or resumption of DCs and at least annually during use of DCs. The physical examinations should include special inspection to blood vessels, head, axillary and pelvic regions including cervical cytology and relevant laboratory tests. In case of undiagnosed persistent or recurrent abnormal vaginal bleeding, appropriate diagnostic measures should be conducted to rule out malignancy. Women with a strong family history of breast cancer or who have breast nodules should be monitored with particular care.

2. Lipid Disorders: Women who are being treated for hyperlipidemia should be followed closely.

3. Liver Function: If jaundice develops in any woman receiving such drugs, the medication should be discontinued. Sexoid hormones may be poorly metabolized in patients with impaired liver function. **4. Fluid Retention:** OCs may cause some degree of fluid retention. They should be prescribed with caution, and only with careful monitoring, in patients

5. Emotional Disorders: Women with a history of depression should be carefully observed and the drug discontinued if depression recurs to a serious degree. **b. Contact Lenses:** Contact lens wearers who develop visual changes or changes in lens tolerance should be assessed by an ophthalmologist.

7. Drug Interactions: Reduced efficacy and increased incidence of breakthrough bleeding and menstrual irregularities have been associated with concomitant use of ritampir. A similar association, though less marked, has been suggested with barbiturates, phenylbutazone, phenytoin sodium, and possibly with griseofulvin, ampicillin, and tetracyclines. **8. Interactions with Laboratory Tests:** Certain endocrine and liver function tests and blood components may be affected by

Q20. **a.** Increased prothrombin and factors VII, VIII, IX, and X; decreased antithrombin 3; increased norepinephrine-induced platelet aggregability. **b.** Increased thyroxine-binding globulin (TBG) leading to increased circulating total thyroxine as measured by protein-bound iodine (PBI). T4 by column or by radioimmunoassay. Free T3 resin uptake is decreased and calculated T3 resin uptake is increased. **c.** Other binding proteins may be altered in various

d. Sex binding globulins are increased and result in elevated levels of total circulating sex steroids and corticoids, however free or biologically active levels remain unchanged. e. Triglycerides may be increased. f. Glucose tolerance may be decreased. g. Serum total levels may be depressed by OC therapy. This may be of clinical significance if a woman becomes pregnant.

9. Carcinogenesis: See WARNINGS section. **10. Pregnancy:** Pregnancy Category X. See CONTRAINDICATIONS and WARNINGS sections. **11. Nursing Mothers:** Small amounts of OC steroids have been identified in the milk of nursing mothers and a few adverse effects on the child have been reported, including decreased milk production. In addition, OCs may in the breast milk interfere with lactation by decreasing milk production.

ADVERSE REACTIONS: An increased risk of the following serious adverse reactions has been associated

with the use of OCs (see WARNINGS section). Thrombophlebitis, arterial thromboembolism, pulmonary embolism, myocardial infarction, cerebral hemorrhage, cerebral thrombosis, hypertension, gallbladder disease, hepatic adenomas or benign liver tumors. There is evidence of an association between the following conditions and the use of OCs, although additional confirmatory studies are required: Mesenteric thrombosis, splanchnic thrombosis. The following adverse reactions have been

confirmatory studies are needed. Mesenteric thrombosis, renal thrombosis. The following adverse reactions have been reported in patients receiving OCs and are believed to be drug related: Nausea, vomiting, gastrointestinal symptoms (such as abdominal cramps and bloating), breakthrough bleeding, spotting, change in menstrual flow, amenorrhea, temporary infertility, after discontinuance of treatment, edema, melasma which may persist, breast changes, tenderness, enlargement.

(secretion; change in weight [increase or decrease]; change in cervical erosion and secretion; diminution in lactation when given immediately postpartum; cholestatic jaundice; migraine; rash (allergic); mental depression; reduced tolerance to carbohydrates; vaginal candidiasis; change in corneal curvature (steepening); intolerance to contact lenses. The following side effects have been reported in users of OTCs, but this association has been neither confirmed nor refuted: Pruritus;

adverse reactions have been reported in users of DUs and the association has been neither confirmed nor refuted. The serious adverse reactions associated with the use of DUs include: agranulocytosis; aplastic anemia; bone marrow depression; blood dyscrasias; dermatitis; epidermal necrosis; exfoliative dermatitis; leukopenia; lymphadenopathy; myelodysplasia; myelosuppression; neutropenia; pancytopenia; peripheral neuropathy; retinopathy; skin eruptions; stomatitis; thrombocytopenia; vasculitis; xeroderma. Other adverse reactions associated with the use of DUs include: alopecia; anorexia; asthenia; constipation; dizziness; dry mouth; fatigue; fever; headache; hirsutism; loss of scalp hair; malaise; mucositis; nausea; numbness; oral ulcers; pruritus; rash; taste changes; weight gain. While the following adverse reactions or conditions are listed as contraindications to the use of DUs, they may also be associated with the use of DUs:

have been reported to be associated with the use of OCs; no causal relationship has been established. Congenital anomalies (Raynaud's disease, sickle cell disease, mitral valve prolapse, increased risk of developing venous thromboembolic disease) among women with blood types A, B or AB as opposed to women with blood type O. **OVERDOSEAGE:** Serious ill effects have not been reported following acute ingestion of large doses of OC's by an individual. Overdose may cause nausea.

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UPDATE

No Abortion Law for Canada

On January 31, Canada's Senate, an appointed body that routinely approves legislation passed by the House of Commons, defeated a new abortion law that would have recriminalized induced abortion under certain circumstances.¹ The tie vote (43-43) left the country with no criminal abortion statute, which has been the case since Canada's Supreme Court overturned the previous law in 1988. The latest bill would have permitted abortion when pregnancy threatened the woman's life or her physical, mental or psychological health, but it was opposed both by pro-choice groups (who believed it to be too restrictive) and by right-to-life forces (who argued that it was too permissive). The Canadian Medical Association also opposed the bill, and had reported that one-quarter of all physicians who had been performing abortions had stopped because of concern over potential harassment and legal liability should the bill become law. The current government has no plans to introduce further abortion legislation, and legal experts believe that few legal avenues for the restriction of abortion remain.²

1. G. York, "Senators Kill Abortion Bill with Tied Vote," *Toronto Globe & Mail*, Feb. 1, 1991, p. 1.

2. G. York, "Abortion Battle Is Over, Analysts Say," *Toronto Globe & Mail*, Feb. 2, 1991.

Unintended Pregnancy in England

Pregnancies that were unintended appear to have become more common in England and Wales during the 1980s, according to a pair of mail surveys conducted five years apart.¹ Among new mothers surveyed in 1989, 31 percent reported that their pregnancy had been unintended; in a comparable sample surveyed in the same manner in 1984, only 27 percent had had an unintended pregnancy. The increase was statistically significant among respondents

in their early 20s (from 27 percent to 44 percent) and those in their late 20s (from 19 percent to 27 percent), as well as among less-educated women and those with one previous birth. There was little change, however, in the percentage of women with an unintended pregnancy who had been practicing contraception around the time of the pregnancy—71 percent in 1984 and 69 percent in 1989. Women who gave birth in 1989 were slightly less likely to have been using the pill most recently than were women who gave birth in 1984 (10 percent vs. 13 percent), but among those who were using it around the time of conception, the proportion with an unintended pregnancy rose from 48 percent to 68 percent. The researcher attributes the incidence of unintended pregnancy to "gaps in knowledge about birth control, even among users."

1. A. Fleissig, "Unintended Pregnancies and the Use of Contraception: Changes from 1984 to 1989," *British Medical Journal*, 302:147, 1991.

HPV Infection in College Women

Up to half of the young women tested at a university health clinic were infected with human papillomavirus (HPV), but many of these infections could not be detected by a commercially available HPV test.¹ A total of 467 patients at a university health clinic (nearly all of whom had come for their annual pelvic examination) were tested for HPV infection using either a commercially available test or an advanced laboratory method for detecting DNA. The women were mostly white (72 percent), young (mean age of 23) and single (94 percent). Forty-six percent tested by the DNA amplification technique were found to be infected, compared with just 11 percent of those tested with the commercial test. The researchers conclude that their "results [show] that HPV infection is common in the healthy women we studied." They also observe that the DNA method they de-

scribe has greater sensitivity and detects a broader range of HPV infections than currently available clinical detection methods.

1. H. M. Bauer et al., "Genital Human Papillomavirus Infection in Female University Students as Determined by a PCR-Based Method," *Journal of the American Medical Association*, 265:472, 1991.

Exercise Eases Delivery

Women who engage in regular, demanding exercise during pregnancy seem to have easier deliveries than women who do not exercise.¹ The investigators monitored the pregnancy and delivery experiences of 67 women who had run recreationally and 64 who had done aerobic training for at least six months prior to becoming pregnant. Forty-six of the runners and 41 of the aerobic dancers had continued to exercise at or above 50 percent of their prepregnancy level, while 21 runners and 23 aerobic dancers had spontaneously halted their exercise regimen during the first trimester of their pregnancy. There was no difference in premature onset of labor or in premature membrane rupture. However, the women who had continued to exercise were less likely than the others to need labor stimulation, an episiotomy, an epidural anesthetic or an operative delivery. Among women who had vaginal deliveries, those who had continued to exercise were in labor for an average of 30 percent less time than were the others. In addition, the babies of the women who had exercised were significantly less likely to have problems associated with stress during labor. The researcher concludes that "continuing a regular running or aerobics exercise program above a maintenance level throughout pregnancy had a beneficial effect on [many] aspects of the course and outcome of labor."

1. J. F. Clapp III, "The Course of Labor After Endurance Exercise During Pregnancy," *American Journal of Obstetrics and Gynecology*, 163:1799, 1990.

Pill Dose and Thromboembolism

Users of oral contraceptives containing 30 mcg of estrogen appear to be at marginally lower risk of venous thromboembolism than are users of higher dose pills.¹ Epidemiologists analyzed data on more than two million oral contraceptive prescriptions filled under Medicaid for over 234,000 Michigan women between 1980 and 1986; 142 cases of deep venous thromboembolism were identified; among these women, for an overall rate of 5.8 cases per 10,000 woman-years of pill use. However, this rate was somewhat lower among women using oral contraceptives with fewer than 50 mcg of estrogen (4.2 per 10,000) than among those using preparations with 50 mcg (7.0 per 10,000) or more (10.0 per 10,000). Thus, users of 50 mcg pills were about 50 percent more likely than users of low-dose pills to experience a thromboembolism, although the difference was not statistically significant. The investigators suggest that future research also examine whether the use of low-dose oral contraceptives lessens the risk of pill-related arterial thromboembolism.

1. B. B. Gerstmann et al., "Oral Contraceptive Estrogen Dose and the Risk of Deep Venous Thromboembolic Disease," *American Journal of Epidemiology*, 133:32, 1991.

Miscarriages after Chernobyl

Spontaneous abortions appear to have increased in a Norwegian county over the three years following the Soviet nuclear accident at Chernobyl in 1986.¹ During the three years prior to the accident, 7.4 percent of the 16,262 known pregnancies in Bergen County, Norway, miscarried. (Because early spontaneous abortions are rarely reported, the investigators counted only miscarriages that required hospital treatment.) During the three years after the area was exposed to radioactive fallout, 8.4 percent of the 19,001 known pregnancies ended in spontaneous abortion, including 8.6 percent of those occurring in the first year after the accident. The investigators also examined rates of spontaneous abortion in the 12 months before and after the accident, by three-month intervals: They found that from May to July 1986 (the first three months after the accident), the rate of spontaneous abortion (7.9 percent) was hardly different from the rate over the same period in 1985 (8.2 percent); however, from August to October and from November to January, the spontaneous abortion rates in the period after the accident were 20 percent higher than those of the same period in 1985 (9.3 percent vs.

7.9 percent, and 9.2 percent vs. 7.6 percent, respectively). The researchers contend that the effects of radioactive contamination of food or water may be contributing to the apparent increase in spontaneous abortions in this area of Norway.

1. M. Ulstein et al., "Outcome of Pregnancy in One Norwegian County Three Years Prior to and Three Years Subsequent to the Chernobyl Accident," *Acta Obstetrica et Gynecologica Scandinavica*, 69:277, 1990.

The First 100,000 AIDS Deaths

By the end of 1990, almost 10 years after the first AIDS-related death became known to the Centers for Disease Control, more than 100,000 Americans had died as a result of AIDS and human immunodeficiency virus (HIV) infection; about one-third of these deaths occurred in 1990 alone.¹ Overall, 90 percent of all AIDS-related deaths so far have occurred among men. Fifty-nine percent of all AIDS-related deaths have been among homosexual or bisexual men who were not intravenous drug users, while 28 percent have been among users of intravenous drugs. Among the latter, 21 percent were women and heterosexual men and seven percent were homosexual and bisexual men. Of all deaths, 55 percent have been among white non-Hispanics, 28 percent among black non-Hispanics and 16 percent among Hispanics. Seventy-three percent of deaths have been among 25-44-year-olds, almost equally divided between 25-34-year-olds and 35-44-year-olds. It is estimated that 165,000-215,000 more Americans will have died of HIV-related causes by 1993.

1. "Mortality Attributable to HIV Infection/AIDS—United States, 1981-1990," *Morbidity and Mortality Weekly Report*, 40:41, 1991.

Improving Access to Obstetricians

An ad hoc coalition of private obstetricians and government officials in Washington state has claimed some success in extending obstetric care to high-risk rural and indigent women.¹ By 1985, the decline in the number of physicians providing obstetric care in the state had left many rural areas underserved or completely unserved; physicians at hospitals serving rural areas of eastern Washington noted an increase in deliveries among women who had received no prenatal care. In 1988, the state chapter of the American College of Obstetricians and Gynecologists joined with the Washington State Obstetrical Association in forming an Access to Maternity Care Committee, consisting of members of professional organizations, the

state health department and the legislature. In addition to working to increase communication between private physicians and officials of the state's Medicaid program, members of the committee formulated legislation designed to increase the number of poor women eligible for Medicaid, raise physician reimbursement rates and provide more funding for programs for high-risk pregnant women, and they helped shepherd the bill through the state legislature. One lesson of the experience, according to a published review, is that private physicians can be mobilized to stimulate public reform, but such efforts should be made in coalition with public officials, and need to involve a wide range of types of providers.

1. D. Schleuning, G. Rice and R. A. Rosenblatt, "Addressing Barriers to Perinatal Care: A Case Study of the Access to Maternity Care Committee in Washington State," *Public Health Reports*, 106:47, 1991.

No National HIV Survey

A long-awaited nationally representative probability survey of U.S. households to determine levels of human immunodeficiency virus (HIV) infection has been cancelled because a recent pilot study cast doubts on the accuracy of the results of such a survey.¹ Eighty-four percent of a sample of adult men and women in Dallas, Texas, contacted by researchers for the Centers for Disease Control (CDC) in 1989 agreed to participate in the study. Blood samples were collected from all 1,724 eligible for the survey who agreed to participate. Three percent reported that they had used intravenous drugs, and five percent said they had had homosexual relations with men. A random follow-up of those who had initially refused to participate, though, revealed that the nonrespondents were more likely to have been involved in such high-risk behavior (seven percent and 17 percent). The researchers used these results to adjust the estimated seroprevalence rate for Dallas from 0.3 percent to 0.4 percent. However, a projection of the number of HIV-infected individuals in the Dallas area based on this infection rate showed a substantially lower number of cases (about 4,000) than did projections based on several established mathematical models. Thus, according to the CDC investigators, the adjusted results probably still understate the prevalence of HIV infection in the Dallas area, and a national survey would likely have the same problem.

1. "Pilot Study of a Household Survey to Determine HIV Seroprevalence," *Morbidity and Mortality Weekly Report*, 40:1, 1991.

Comparing the Health Risks and Benefits Of Contraceptive Choices

By Kathryn Kost, Jacqueline Darroch Forrest and Susan Harlap

Summary

Simulation models were used to compare the health consequences of birth control methods currently relied on by American women with those of using no method. The incidence of morbidity and mortality related to unintended pregnancies, live births, abortions, upper genital tract infections, tubal infertility, cardiovascular disease and reproductive cancers were estimated for hypothetical cohorts of 100,000 women aged 15–44. Women who never use any method and who never have an abortion would have an average of 18 births during their reproductive lifetime, compared with no more than five among women using any of the available birth control methods. Consequently, use of any method prevents more deaths from pregnancy and childbirth than are associated with method use.

The proportion of women who would become infertile—estimated by taking into account the likelihood of developing upper genital tract infections and the probability that any pregnancies that occurred would be ectopic—is reduced substantially if women at low risk of sexually transmitted diseases use any method and if women at high risk use oral contraceptives or barrier and spermicide methods.

Oral contraceptive use has a relatively small, independent effect on the risk of cardiovascular diseases, but it greatly augments that risk in combination with smoking and increased age. When ovarian, endometrial and breast cancers are considered together, there will be approxi-

Barrier and spermicide methods and oral contraceptives provide protection against cervical, ovarian and endometrial cancers; this protection outweighs the higher risk of breast cancer at certain ages among women who have used the pill.

mately 110 fewer diagnoses of these three cancers per 100,000 ever-users of the pill aged 15–54 than among 100,000 never-users; furthermore, prior to age 45, 100,000 ever-users will experience 10 fewer deaths from ovarian or endometrial cancers than never-users of the pill. In addition, women who use barrier or spermicide methods at ages 15–19 will, by age 45, experience approximately 60 fewer deaths per 100,000 from cervical cancer than will nonusers.

Introduction

Two-thirds (38.8 million) of all American women between the ages of 15 and 44 are sexually active, do not want to conceive, but probably can do so if they do not use a contraceptive method.¹ (Women relying on sterilization—either their own or their partner's—are included in this figure because sterilization, although extremely effective, is not foolproof.) Thirty-five million (90 percent) of these women use a method.² Given the large number of contraceptive users, reports in public and scientific media of life- and health-threatening effects of contraceptives have the potential to alarm many people. In fact, concern about possible side effects of contraceptives is the most common reason given for not using a method by women who are at risk of unintended pregnancy.³ And because many people do not give equal consideration to reports of the beneficial effects of contraceptive use on women's current and future health, they may have unbalanced perceptions of the real health effects of contraceptive use.

Sexually transmitted diseases (STDs)

and their consequences are a widespread problem that receives little public attention. Many people are aware of AIDS but are less aware of other STDs and their impact on women's reproductive health. Like AIDS, these other STDs continue to spread in the United States, with more than 12 million new cases estimated in 1989.⁴ As the incidence of STDs rises, so does the incidence of upper genital tract infections and ectopic pregnancy, potential consequences of STD infection that can lead to infertility. Today, because more and more young women and men are postponing childbearing until the middle or later years of their reproductive life, preventing infertility has become an important companion goal to postponing pregnancy.

No one wants to use a contraceptive that might have harmful consequences, either now or in the future. To choose an appropriate method, individuals need to know whether they have a medical condition that might rule out the use of certain methods (e.g., high blood pressure), whether their own behavior contraindicates the use of a method (e.g., having multiple sexual partners or smoking) or whether the method itself could threaten their health.

This article draws from a recently completed study that compared the health risks and benefits of contraceptive methods currently available in the United States and one method (injectable progestins) that is available in other industrialized countries and has been used by many women now living in the United States.⁵ We focus on health consequences of contraceptive choices among sexually active, fecund women who do not want to become preg-

Kathryn Kost is a senior research associate and Jacqueline Darroch Forrest is vice president for research at The Alan Guttmacher Institute; Susan Harlap is chief, Epidemiology Service, Memorial Sloan-Kettering Cancer Center, New York. This article is adapted from S. Harlap, K. Kost and J. D. Forrest, *Preventing Pregnancy, Protecting Health: A New Look at Birth Control Choices in the United States*, The Alan Guttmacher Institute, New York, 1991.

nant. The choices examined are periodic abstinence, withdrawal, barrier and spermicide methods* (the condom, the diaphragm, the cervical cap, the sponge, and spermicides), the IUD, oral contraceptives, progestin implants (NORPLANT®), injectable progestins (Depo-Provera), tubal sterilization, vasectomy, and use of no method. In particular, we compare the risks of pregnancy, infertility, heart disease, cancer and death faced by women using various methods with those faced by women using no method.

Models

To estimate the impact of method differences on pregnancy rates and on the risk of infertility, we used a decision-tree analysis program⁶ that allowed us to calculate the number of unintended pregnancies, live births, induced abortions, spontaneous abortions, ectopic pregnancies, upper genital tract infections and cases of infertility that would occur in a hypothetical cohort of 100,000 women within a specified period of time, given a set of probabilities for each outcome. We obtained method-specific probability estimates for these outcomes from an extensive review of previous studies that measured the relative risks of these outcomes among users of various methods. We constructed one model for each method. Our models simulated the reproductive health experiences of a population of women on a month-to-month basis by using estimates of the probability of each event in a given month.†

At the start of the simulation, all 100,000 women were assumed to be nonpregnant and sexually active, and to have no known impairments to their fertility. We estimated the number of women who would experience each outcome within five years after beginning use of a method. To obtain annual estimates of events, we took the distribution in the population of all temporary conditions (e.g., uterine pregnancy, ectopic pregnancy and infection) in the last month of the 60-month simulation process and multiplied by 12.‡ To obtain an estimate of the number of women who would become infertile each year, we divided the final number of women who became infertile by five. The models, and the particular assumptions that each one contains, are explained more fully elsewhere.⁷

To compare the implications of different contraceptive choices for the various outcomes, we had to make assumptions that inevitably simplify complex issues. The numerical assumptions we used for the probabilities of particular events were,

whenever possible, based on reviews of published studies. However, study results do not always agree on the direction or the magnitude of relationships, and scientists debate even how to measure the occurrence of some of these outcomes in a population. To simplify the analysis and findings of the study, we chose to make specific numerical assumptions rather than make multiple assumptions or use ranges in our calculations. Because we sought to determine if the health benefits of contraceptives outweigh their risks, we chose to err on the side of conservative estimates of contraceptive benefits.

Our estimates came from studies of groups of women and therefore are more strictly applicable to groups of women—or to the hypothesized average woman—than to individual women, whose behavior or health characteristics may differ from the group average. The estimated values we present here should not be interpreted as predictions of the actual number of events that do or will occur in a given year. Instead, our purpose is to compare contraceptive choices within a common framework and thereby put into perspective current knowledge about the public health benefits and risks of various contraceptive methods.

Preventing Pregnancy

Because the benefits and risks predicted in our models were greatly affected by the monthly risk of pregnancy we assumed for each method, we sought to represent a realistic risk of pregnancy for an average woman. There are several kinds of failure rates, reflecting the experience of different kinds of users. For example, James Trussell and colleagues estimated contraceptive failure rates for perfect users and for typical users.⁸ Perfect-use estimates (the rates expected among a group of couples who all use a method perfectly, i.e., consistently and correctly), are derived from an assessment of numerous studies of contraceptive failure.⁹ Typical-use estimates are usually obtained from population-based surveys that reflect the experience of groups of actual users, some of whom use the method perfectly and some of whom do not. Thus, typical-use failure rates are higher than perfect-use failure rates. The typical-use failure rates reported by Elise Jones and Jacqueline Forrest are higher than those of Trussell and colleagues, in part because the former include estimates of unreported abortions.¹⁰ In addition, Jones and Forrest give age-specific estimates of abortion-adjusted typical failure rates by marital status and race.

In this article, we use low estimates of typical-use failure rates obtained from the Jones and Forrest study. We selected the lowest estimate of typical-use failure among the marital and racial subgroups in each age category. To obtain overall estimates of low typical failure rates for each method—among women 15–44 years old, rather than by age-group—we took the average of the lowest estimates for each age-group. If low typical-use failure rates for specific methods were not available in the Jones and Forrest study, we used information from several different sources to estimate them.¹¹

We chose to apply first-year failure rates, although our models are run for longer than one year and failure rates may decline at longer durations of use. We made that choice for the following reasons: Most studies have presented estimates of contraceptive failure only in the first year of use, and thus our understanding of the failure rates of different methods is most refined for the first year; appropriate data are not available to estimate the rate at which the failure rate for each method declines over time, and rates for longer durations of use—which are available from only a few studies—may represent the failure experience among a select group of women who are least likely to fail; and, for most methods, first-year rates are not limited to first-ever use (i.e., some women will have used the method before). By applying first-year failure rates to models that simulate the experience of women for longer periods, we may overestimate the number of contraceptive failures. In that case, however, the result would be to underestimate the benefits of contraceptive use that are linked to pregnancy prevention.§

*In this article, barrier and spermicide methods include the condom, the diaphragm, the cervical cap, the sponge, and spermicide (used alone or in conjunction with a barrier method). A woman using a barrier or spermicide method uses one or more of the methods in this group.

†The simulation process keeps track of the history of the population and updates probabilities as the process progresses. For example, once a woman has experienced an ectopic pregnancy, her risk of becoming infertile, as well as her risk of experiencing another ectopic pregnancy, is increased.

‡We based our annual estimates on this five-year distribution for two reasons: The distribution after only one year is greatly affected by the starting assumption that none of the women entering the model are pregnant, and the distribution after five years, although somewhat arbitrarily chosen, allows enough time for the population to experience the various risks.

§For a more detailed explanation of the derivation of our failure rates, including the calculation of age-specific rates, see reference 5.

Table 1. First-year failure rates among women aged 15–44 and estimated number of births and abortions per woman using one method for 30 years, by method

Method	% pregnant within one year	Births*	Abortion†
No method	85.0	18	35
Periodic abst.	13.8	3	4
Withdrawal	14.7	3	4
Condom	9.8	2	3
Diaphragm/cap	12.0	3	3
Sponge	16.0	4	4
Spermicides	21.6	5	6
IUD	2.5	0	1
Pill	3.8	1	1
Implants	0.05	0	0
Injectables	0.4	0	0
Tubal ster.	0.5	0	0
Vasectomy	0.2	0	0

*Assumes that all pregnancies that are not ectopic or spontaneously aborted will end in a live birth.

†Assumes that all pregnancies that are not ectopic or spontaneously aborted will end with an induced abortion.

Notes: Estimates of births and abortions are rounded; zero indicates that the value is 0.5 or less. The numbers shown should be interpreted only as illustrations of the magnitude of differences among methods and of the differences between contraceptive users and nonusers, and not as predictions of the experience actual women would have.

The first column of Table 1 shows the failure rates we used in our models. The "no method" category represents the expected pregnancy experience of women who choose not to use contraceptives but do not believe that they are infertile;¹² pregnancy rates among these women are at least four times as high as the rate among those using any method. Failure rates vary widely, with the highest rates occurring among users of periodic abstinence, withdrawal, or barrier and spermicide methods (10–22 percent become pregnant in the first 12 months of use), followed by those among users of the pill or the IUD (3–4 percent) and those among women who rely on implants, injectables or sterilization (less than one percent).

Almost all U.S. women—95 percent of those who have ever had sex—use contraceptives at some time.¹³ On average, each woman uses three different methods.¹⁴ To create a standard comparison, we estimated the effect of contraceptive use on the number of births or abortions an average woman would have if she used one

method from age 15 to age 44 and chose either birth or abortion for all accidental pregnancies that occurred, as shown in the last two columns of Table 1.* Women who used no method during their entire reproductive life span and who never had an induced abortion would have far more births than women who used any of the contraceptive methods (18 vs. no more than five). Likewise, among women who terminated all their pregnancies by induced abortion, those using no method of contraception would have far more abortions than contraceptive users, including women who used the least effective methods. Among women using some methods, those who had an abortion every time they became pregnant would have more pregnancies than those who gave birth every time they became pregnant, because they would be exposed to the risk of a subsequent pregnancy much sooner than women who carried every pregnancy to term. However, as Table 1 shows, regardless of how women resolve their pregnancies, use of even the least effective contraceptive will result in many fewer pregnancies than use of no method.

Preserving Fertility

Most women and men in the United States have more than one sexual partner during their lifetime. Two-thirds of all U.S. women who have ever had intercourse have had more than one partner.¹⁵ Many of them, especially young women, have more than one partner within a short time. With each new sexual partner, a woman faces the risk of becoming infected with an STD.

STDs can have a substantial impact on women's health. Some STDs can cause upper genital tract infections that can damage a woman's reproductive organs, such as pelvic inflammatory disease (PID) or infections following pregnancy (whether it ends in spontaneous abortion, induced abortion or birth). Each year, more than one percent of the sexually active women in this country receive treatment for PID.¹⁶ Usually the direct result of a sexually transmitted disease, PID often causes pain and fever, but its symptoms can be so mild that women do not realize they have it. Whatever the severity of the symptoms, PID and pregnancy-related infections can cause permanent scarring of the fallopian tubes or peritoneum, which may lead to ectopic pregnancy or tubal infertility. The more upper genital tract infections a woman has, the more likely it is that any pregnancies she has will be ectopic. Moreover, once a woman has ex-

perienced an ectopic pregnancy, the more likely it is that any subsequent pregnancy will be ectopic. Women who have had an ectopic pregnancy are likely to become infertile, and the risk of infertility rises quickly with increasing numbers of ectopic pregnancies.

Individuals who are in mutually monogamous relationships are not at risk of acquiring an STD if neither partner is infected. But for those who are not in mutually monogamous relationships or who have a relationship with a person who has an STD, contraceptive choices can greatly affect the risk of acquiring an STD and therefore the risk of experiencing an upper genital tract infection, an ectopic pregnancy or tubal infertility. The use of barrier and spermicide methods can greatly reduce the risk of STD transmission. However, if these methods are not used correctly at every act of intercourse, they are relatively ineffective in preventing pregnancy and probably in preventing infection as well.¹⁷ The other methods have little, if any, effect on the risk of acquiring an STD; however, they alter women's risk of developing upper genital tract infections or affect the likelihood that, if a pregnancy does occur, it will be ectopic.

In our model, we took into account the effects of method choice on the likelihood of developing upper genital tract infections, the probabilities that any pregnancies that do occur will be ectopic and the resulting chances of developing tubal infertility. The first column in Table 2 shows method-specific relative risks of acquiring PID, based on estimates from studies that measured the effect of contraceptive use on the risk of developing PID during use.

If a woman experiences an unintended pregnancy while using no method or as a result of contraceptive failure, the probability that the pregnancy will be ectopic—thus increasing the risk of future tubal infertility—is affected by what method she is using, as shown in column 2 of the table.

Because the most important factor influencing the risk of tubal infertility is a woman's likelihood of acquiring an STD, we modeled method differences for two groups—women who are at high risk of acquiring an STD (those who have multiple partners or are in relationships that are not mutually monogamous) and those who are at low risk. For all nonpregnant women who are using no contraceptive, we estimated the monthly baseline risk of PID to be 174 infections per 100,000 women. We assumed that the lowest risk

*Of course, it is not realistic to assume that all accidental pregnancies will result in a live birth or that all will result in an induced abortion. In fact, about 41 percent of pregnancies resulting from a contraceptive failure will end with an induced abortion (see reference 5). For the purposes of comparing the implications of differing risks across methods, however, it is preferable to assume the same outcome for all methods.

of STD infection—and therefore the lowest risk of PID and subsequent infertility—would be found among women in mutually monogamous relationships, and we estimated the risk of PID among such women at 10 percent of the baseline estimate. For women not in mutually monogamous relationships, we assumed that the PID rate is approximately three times the baseline rate.

We calculated the monthly risks of developing PID by multiplying the baseline nonpregnancy-associated rate of PID for women at low risk and for women at high risk of STDs (17.4 infections and 522.0 infections per 100,000 women, respectively) by the relative risks given in the first column of Table 2. Although women are also vulnerable to infections associated with pregnancy outcomes, we assumed no effect of current method use on the risk of puerperal or postabortion infections because contraceptives would not be used during pregnancy.

Columns three through six in Table 2 show the estimated numbers of women who become infertile per 100,000 women using specific contraceptive methods or using no method, according to their risk of STDs. For each risk group, we present the results from two sets of models. In the first set, all pregnancies that occur in the five-year period (other than those that are ectopic or spontaneously aborted) will continue to a live birth. In the second set of estimates, we assume that all pregnancies not ectopic or spontaneously aborted are terminated by an induced abortion.

The model predicts that among both nonusers and users of contraceptives, more women will become infertile in a group terminating all pregnancies in induced abortion than in a group carrying all pregnancies to term. Although the risk of infection associated with induced abortion is lower than that associated with childbirth, women in the first group would become pregnant more often, and therefore would have more frequent exposure to the risk of ectopic pregnancy, than would women in the second group. In addition, women in the group in which all pregnancies end in abortion would spend less time being pregnant and more time exposed to the risk of PID than women in the group carrying all pregnancies to term.

Table 2 shows that among women at low risk of STD infection, estimated rates of tubal infertility for women using any contraceptive method are lower than those for women using no method, who have a high risk of pregnancy-related upper genital tract infections because of their large numbers of pregnancies. Among women at high risk for STDs, the contraceptive method used can have a large effect on the risk of developing tubal infertility. The estimated rates of tubal infertility are lowest in the group of women using barrier and spermicide methods and highest among women using the IUD, periodic abstinence or no method.

The model predicts that more women will experience tubal infertility if their partners use a condom than if they themselves use a diaphragm, regardless of

Table 3. Estimated annual number of deaths per 100,000 ectopic pregnancies, live births and induced abortions, by five-year age-groups

Age-group	Ectopic pregnancies	Live births	Induced abortions
15-44	49	8.0	0.4
15-19	119	6.0	0.5
20-24	56	6.4	0.3
25-29	28	6.4	0.4
30-34	41	9.1	0.4
35-39	53	19.1	0.4
40-44	71	42.9	0.4

whether the women are at low risk or high risk of STD infection. As the second column of Table 2 shows, we assumed that the relative risk of PID associated with the condom is higher than the risk associated with the diaphragm (0.5 vs. 0.4), and that spermicides are associated with a somewhat higher relative risk than either of those methods (0.6). Although we might expect the condom to be more effective than the diaphragm in preventing infections because of the physical barrier they present to bacteria and viruses, only two studies have made separate measurements of the relative risks of PID among condom users, diaphragm users and spermicide users.¹⁸ We obtained our relative risks from those studies, which found no statistically significant differences among those methods, although diaphragm users had lower risks of PID. Although the studies included controls for education, history of gonorrhea and sexual activity, we do not know whether the contraceptive users differed in other ways that might affect their exposure to the risk of STDs. For example, the diaphragm users may have used their method more consistently than users of the other contraceptives.

Protecting Health

Pregnancy and childbirth, once major causes of mortality among American women, are now much safer; however, they still account for 1-2 percent of all deaths each year among women aged 15-44.¹⁹ As Table 3 shows, ectopic pregnancy is the outcome with the greatest risk of death, and induced abortion the one with the least. By preventing pregnancy, contraceptives reduce the risk of such deaths.

We calculated estimates of pregnancy-related mortality for each method from the simulation models, assuming a low risk of STD infection. The results, shown in the first two columns of Table 4 (page 58), include deaths from ectopic pregnancy, live births, induced and spontaneous abortions, upper genital tract infections devel-

Table 2. Relative risk of PID; risk that a pregnancy will be ectopic; and five-year infertility rate per 100,000 women, by risk for STDs and pregnancy outcome; according to contraceptive method used

Method	Relative risk of PID	Risk that pregnancy is ectopic	Tubal infertility rate			
			Low risk of STD		High risk of STD	
			Birth	Abortion	Birth	Abortion
No method	1.0	0.002	400	740	3,800	6,400
Periodic abst.	1.0	0.003	190	200	4,500	4,800
Withdrawal	0.5	0.002	110	110	2,300	2,400
Barrier & spermicide methods	0.5	0.002	110	110	2,000	2,300
Condoms	0.5	0.002	90	100	2,300	2,300
Diaphragm/cap	0.4	0.002	90	90	1,100	2,000
Sponge	0.4	0.002	100	100	1,900	2,000
Spermicides	0.6	0.002	140	150	2,700	2,900
IUD	1.4*	0.03	280	280	7,100	7,100
Pill	0.5	0.002	80	80	2,200	2,300
Implants	0.5	0.14	80	80	2,200	2,200
Injectables	0.5	0.13	120	120	2,300	2,300
Vasectomy	0.5	0.002	70	70	2,200	2,200

*The relative risk was assumed to drop linearly from 4.0 in the first month after insertion to 1.4 after the third month of use.

Table 4. Annual pregnancy-related and method-related mortality rates per 100,000 women aged 15-44 who are at risk of unintended pregnancy and at low risk for STDs, by method

Method	Pregnancy-related*		Method-related
	Birth	Abortion	
No method	5.3	1.2	na
Periodic abst.	1.0	0.1	na
Withdrawal	1.0	0.1	na
Condom	0.7	0.1	na
Diaphragm/cap	0.8	0.1	na
Sponge	1.1	0.1	na
Spermicides	1.5	0.2	na
IUD	0.2	0.1	na
Pill	0.3	<0.1	1.0†
Long-acting horm.‡	<0.1	<0.1	0.5†
Tubal ster.	0.1	0.1	1.0§
Vasectomy	<0.1	<0.1	0.1§

*Pregnancy-related risks include deaths associated with live births, spontaneous and induced abortions, ectopic pregnancies, upper genital tract infections following live births, spontaneous and induced abortions, and trophoblastic disease. These estimates are based on two sets of simulation models, one assuming no pregnancy ends in induced abortion (birth, col. 1), and the other assuming no pregnancy ends in a live birth (abortion, col. 2).

†The risk from cardiovascular diseases. Estimates assume no hormonal contraceptive user aged 25-34 smokes heavily and none aged 35-44 smokes at all.

‡Average of estimates for implants and injectables.

§The risk is a one-time risk to the person being sterilized.

Note: na=not applicable

oped at the time of pregnancy resolution and trophoblastic disease.*

The birth column gives the estimated annual mortality among 100,000 women using each method or no method if they continued all pregnancies to a live birth; the abortion column gives the mortality estimates if women terminated all preg-

nancies by induced abortion. As Table 4 shows, using no method carries the greatest risk of death, although choosing abortion rather than childbirth greatly reduces the risk. Mortality rates among users of various methods differ according to the failure rate of each method.

Also shown in Table 4 are method-related risks of death associated with use of oral contraceptives, long-acting hormonal methods, tubal sterilization and vasectomy. We assumed no age variation in the risk of death from a sterilization operation, which is a one-time risk to the person being sterilized (male or female). These are rough estimates; there are almost no current data from which to calculate more precise ones. The method-related deaths for users of oral contraceptives and long-acting hormonal methods result from cardiovascular disease.²⁰

•**Cardiovascular disease.** Thirty years ago, when oral contraceptives first became available to American women, the dose of estrogen was about three times the amount used today. It was soon found that the risk of cardiovascular disease was higher among users. Further study revealed that the risk was related to the dose of hormones in the pill, to factors that predisposed the women to cardiovascular disease, and to smoking. Today, many women with underlying risk factors are advised not to use the pill, as are older smokers.

Estimates of the risks of cardiovascular disease presented here are derived from previous research. However, we do not use simulation models to compare method differences in the risk of this outcome. The estimated effects from the simulation models are largely the result of variations in the risk of pregnancy, and we cannot estimate the effect of pregnancy on cardiovascular diseases because pregnant women have been excluded from studies of these diseases. Therefore, our estimates are derived from data on age-specific relative risks for current users of oral contraceptives. There is no evidence that any of the nonhormonal methods affect cardiovascular risks, so the comparison group for pill users is all other women at risk of unintended pregnancy.

Oral contraceptive use has been shown to affect only certain cardiovascular diseases, such as myocardial infarction (heart attack), venous thrombosis and embolism, and two kinds of strokes—those resulting from subarachnoid hemorrhage and those caused by thrombosis or embolism (non-hemorrhagic strokes). The risk of cardiovascular disease increases with age, partly because the prevalence of predisposing

risk factors—high blood pressure, diabetes and physical inactivity—increases with age. Smoking also increases the risk among all women, whether or not they use oral contraceptives.

Table 5 shows the combined annual incidence, by age, of the different types of cardiovascular disease among users and nonusers of oral contraceptives who are nonsmokers, light smokers (1-24 cigarettes per day) or heavy smokers (25 or more cigarettes per day). The overall incidence of these diseases is affected by both smoking and oral contraceptive use.

Table 5 also shows estimates of the total number of deaths from these cardiovascular diseases per 100,000 women by age, pill use and smoking status. Mortality varies by the type of cardiovascular disease. We assume that 25 percent of women who experience a myocardial infarction or subarachnoid hemorrhage, 10 percent of those who have a nonhemorrhagic stroke, and one percent of those who experience venous thrombosis and embolism do not survive.²¹ As these data demonstrate, the risk of dying from cardiovascular disease is highest among older women who use oral contraceptives and smoke heavily.

The table shows estimates of cardiovascular mortality among separate subgroups of smokers and oral contraceptive users. To estimate how many deaths from cardiovascular diseases per 100,000 oral contraceptive users are attributable to the method, we had to make assumptions about the distribution of smoking behavior (none, light or heavy) in the group of women using oral contraceptives. We assumed that all pill users older than 35 do not smoke and that users aged 25-34 either do not smoke or are light smokers, because oral contraceptive use is contraindicated for older smokers and for younger women who smoke heavily. Using this assumption, we estimated that in the six five-year age-groups (15-19, 20-24, etc.) there would be 0.4, 1.0, 0.9, 1.6, 0.7 and 1.3 more deaths, respectively, each year per 100,000 oral contraceptive users than among women who are not using oral contraceptives. Among 100,000 users aged 15-44, there would be one death attributable to pill use (as shown in Table 4).

Some scientists believe that the risk of cardiovascular disease associated with progestin-only long-acting hormonal methods is likely to be lower than the risk associated with oral contraceptives, both because the long-acting methods do not contain estrogen and because they typically contain lower doses of progestin than do pills. Under the same assumptions

*Mortality rates were applied per 100,000 events estimated by the simulation models as follows: live births, eight; induced abortions, 0.4; spontaneous abortions, 1.5; ectopic pregnancies, 49; upper genital tract infections following live births, spontaneous and induced abortions, three (see reference 5). Trophoblastic disease, also called molar pregnancy, is an abnormal development of trophoblastic tissue (the part of the embryo that forms the placenta) that occurs in about 0.1 percent of pregnancies. At least 15 percent of cases are treated with chemotherapy. (See R. S. Berkowitz and D. P. Goldstein, "Diagnosis and Management of the Primary Hydatidiform Mole," *Obstetrics and Gynecology Clinics of North America*, 15:491, 1988; and S. L. Currey et al., "Hormonal Contraception and Trophoblastic Sequelae After Hydatidiform Mole," *American Journal of Obstetrics and Gynecology*, 160:805, 1989.) To obtain the total number of cases of trophoblastic disease that received chemotherapy, we added cases that would not be associated with molar pregnancies at a rate of 2.5 per 100,000 pregnancies. (See J. A. Lederman et al., "Curable Metastatic Cancer in Young Women," *British Medical Journal*, 295:432, 1987.) We arbitrarily assigned a mortality rate of one percent to all cases of trophoblastic disease that required chemotherapy; that is, 0.015 percent of all pregnancies that are neither ectopic nor spontaneously aborted.

about smoking at older ages as those described above for oral contraceptive users, U.S. women in the six five-year age cohorts who use progestin-only long-acting hormonal methods would have 0.2, 0.6, 0.5, 0.8, 0.4, and 0.5 more deaths from cardiovascular disease, respectively, per 100,000 users than women at risk of unintended pregnancy who are not using hormonal methods.*

•**Cancers.** In the United States, cancers of the reproductive system—those affecting the cervix, ovaries, endometrium or breasts—make up about 40 percent of all cancers diagnosed in women. In recent years, media reports of an association between oral contraceptive use and breast cancer have left millions of women wondering if their past or current use of the pill has endangered their health, or even their lives. Of all women aged 15–44 who have ever had intercourse, 79 percent have used oral contraceptives; about 25 percent of those women are current users.²²

As in our estimates of cardiovascular disease, we do not use simulation models to compare the effects of different contraceptive methods on the risk of cancers. The estimated effects from the simulation models are largely the result of variations in the risk of pregnancy and we are not able to estimate the effect of pregnancy on cancers. Therefore, our estimates are derived from applications of relative risks among women who have ever used barrier or spermicide methods (for cervical cancer estimates) or among those who have ever used oral contraceptives (for estimates of all other reproductive cancers); in each case, the comparison group is women who have never used the method.

Cervical cancer is thought to be caused, in part, by certain strains of human papilloma virus, an STD. The risk of this cancer is related to the number of sexual partners a woman, or her partner, has had. Cervical cancer is more likely to be diagnosed among women older than 30 than among those who are younger, and in every age-group, women who have never used barrier or spermicide methods are almost twice as likely as ever-users to develop this cancer. Among women who have never used a barrier or spermicide method, the incidence of cervical cancer rises from three per 100,000 20–24-year-olds to 27 per 100,000 50–54-year-olds; among ever-users, it increases from one per 100,000 to 14 per 100,000 across those age-groups. (These rates do not take number of sexual partners into account.)

The incidence of ovarian cancer is lower

Table 5. Estimated annual incidence of and number of deaths from cardiovascular diseases per 100,000 women, by smoking status, according to age-group and use or nonuse of the pill

Incidence and deaths	15–19		20–24		25–29		30–34		35–39		40–44	
	Non-users	Users	Non-users	Users	Non-users	Users	Non-users	Users	Non-users	Users	Non-users	Users
Annual incidence												
Nonsmokers	1	3	4	9	10	26	12	33	19	46	34	83
Light smokers*	2	7	7	21	19	57	25	75	37	113	67	206
Heavy smokers†	8	33	24	90	61	250	77	353	110	624	198	1,156
Deaths												
Nonsmokers	0	0	0	0	0	1	1	2	2	5	5	9
Light smokers*	0	0	0	1	1	3	2	6	5	15	9	29
Heavy smokers†	0	3	1	9	3	25	5	47	12	109	22	208

*1–24 cigarettes per day; †≥25 cigarettes per day.

Note: Cardiovascular diseases include myocardial infarction, subarachnoid hemorrhage, nonhemorrhagic stroke, and venous thrombosis and embolism.

among women who have used oral contraceptives at some time than among women who have never used them. As Table 6 (page 60) shows, the risk of ovarian cancer rises steadily with age, but the likelihood of an ovarian cancer diagnosis among women who have ever used the pill is about 60 percent of the incidence among nonusers.²³ This reduction in risk increases with the duration of use and continues for many years after use has ceased.²⁴

Oral contraceptives also reduce the incidence of endometrial cancer, which also rises with increasing age (Table 6). The risk of this cancer, like that of ovarian cancer, is lowered by longer durations of oral contraceptive use, and the protective effect continues for many years after pill use ends.²⁵

The full relationship between oral contraceptive use and breast cancer is still unclear. Among all women aged 15–54, the risk of a breast cancer diagnosis is the same among ever-users and never-users. Furthermore, studies have shown that women who first use the pill at age 25 or older have the same rate of breast cancer diagnosis as women who never use it.²⁶ Some studies have suggested that women who begin use of the pill in their adolescence or early twenties are more likely than those who begin use later to be diagnosed with breast cancer in their thirties and early forties. However, the evidence also suggests that at older ages, these women have lower rates of breast cancer diagnosis than women who never used the pill.

Breast cancer is rarely diagnosed among women younger than 25. Three studies (in the United States, Great Britain and New Zealand) show a higher risk of breast cancer at ages 25–34 among women who have ever used oral contraceptives than among never-users.²⁷ Two of these studies found

that the risk of breast cancer at older ages—45 or older in the U.S. study and 35 or older in the New Zealand study—was lower among ever-users of the pill than among never-users. The British study did not include women in these age-groups.

Several explanations have been suggested for the apparent increase in the risk of breast cancer diagnosis among oral contraceptive users in the middle reproductive ages (25–34) and for the possible decrease in risk at older ages. Because pill users are screened for breast cancer more frequently than nonusers,²⁸ their breast cancers may be detected earlier. Another hypothesis is that the hormones in oral contraceptives accelerate the growth of an undiagnosed breast cancer (or of certain types of breast cancer) but do not cause its initial development. This effect would be consistent with the way pregnancy temporarily increases the risk of breast cancer.²⁹

To put into perspective the pill's overall effect on the risk of cancers, Table 6 presents the combined incidence of ovarian, endometrial and breast cancers expected among women who have ever used the pill and those who have not. Ever-users in each age-group can expect fewer cancer diagnoses than never-users except at ages 25–34, when women who have ever used oral contraceptives will experience nearly the same overall incidence of cancer as women who have never used the pill.

Overall, any pill-related increases in the risk of breast cancer are more than offset by decreases in ovarian and endometrial

*These calculations assume that users of progestin-only long-acting hormonal methods have no increased risk of mortality from myocardial infarction, venous thrombosis and embolism, or nonhemorrhagic stroke, but that they have the same risk of mortality from subarachnoid hemorrhage as that among oral contraceptive users (see reference 5).

Table 6. Estimated annual number of selected reproductive cancers diagnosed per 100,000 women, by age at diagnosis, according to type of cancer and pill use

Type of cancer and pill use	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
Total								
Never used	2	4	11	31	80	148	251	298
Ever used	1	3	13	36	79	143	203	237
Ovarian								
Never used	2	3	4	6	10	17	27	33
Ever used	1	2	3	4	6	10	16	20
Endometrial								
Never used	0	0	1	4	9	19	36	55
Ever used	0	0	1	2	5	10	18	28
Breast								
Never used	0	1	6	21	61	112	188	210
Ever used	0	1	9	30	68	123	169	189

cancers, so women who have used oral contraceptives develop fewer cancers than never-users. The difference between the two groups widens in the middle to late reproductive years as the incidence of ovarian and endometrial cancers rises.

Current and Future Risks

Women who use contraceptive methods are at some risk of death from unintended pregnancy and from causes that are more directly related to specific methods, such as cardiovascular disease and complications of surgical sterilization, but their risk is much lower than if they used no method. In addition, barrier and spermicide methods and oral contraceptives provide protection against potentially fatal cervical, ovarian and endometrial cancers; this protection outweighs the higher risk of breast cancer at certain ages among women who have used the pill.

The first section of Table 7 shows the annual numbers of deaths averted, by five-year age-groups, among current users of barrier or spermicide methods and users of oral contraceptives; the second section estimates the number of cancer deaths before age 45 averted in each age-group among women who ever use barrier or spermicide methods or ever use oral contraceptives. Estimates of deaths averted among current users assume that all pregnancies to women using the specified method or using no method that are neither ectopic nor spontaneously aborted would continue to a live birth. Although the numbers would be different if the pregnancies ended in abortion, the conclusions would be similar.

Use of these methods prevents deaths at all ages that would occur if women used no method. For example, among 100,000 women aged 15-19 using barrier or sper-

micide methods, there would be almost four fewer deaths from pregnancy and childbirth than if those 100,000 women had used no method. In addition, the risk of dying from cervical cancer is lower than it would be if those women never used barrier or spermicide methods. For every 100,000 women who use such methods at ages 15-19, approximately 60 deaths from cervical cancer before age 45 are averted. This long-term protection continues even if the user changes methods after age 20.

Every year, there are an estimated 4.5 fewer deaths per 100,000 women aged 30-34 among those using oral contraceptives than among those using no method; in addition, because of the protective effects of the pill, there will be 15 fewer deaths from ovarian and endometrial cancers among these women before age 45. Thus, oral contraceptives and barrier and spermicide methods save lives in two

Table 7. Estimated deaths averted annually per 100,000 current users of barrier and spermicide methods or the pill; and cancer deaths averted before age 45 per 100,000 ever-users of those methods; all by age-group

Age-group	Deaths averted by current use*		Cancer deaths averted by ever use	
	Barrier & spermicide methods	Pill	Barrier & spermicide methods	Pill
15-19	3.8	3.9	60	23
20-24	4.0	4.1	60	21
25-29	3.9	3.7	58	19
30-34	5.1	4.5	49	15
35-39	10.2	10.7	33	16
40-44	17.9	18.7	12	10

*Estimated from simulation models assuming that all pregnancies not ectopic or spontaneously aborted will end in a live birth and that all are to women at low risk of STDs.

ways: They prevent deaths while the method is being used—primarily by preventing pregnancy—and they prevent future deaths through the protection they provide against cancer.

Conclusions

As women pass through different stages of their reproductive life, each contraceptive method offers a somewhat different combination of risks and benefits, not only to their current well-being, but also to their chances of being able to bear children and remain in good health in the future. As their needs, options and preferences change over time, women must reevaluate their choice of contraceptive. A new sexual partner, a commitment to mutual monogamy, a pregnancy or a completed family may lead to new contraceptive needs and choices. Women need to consider a variety of factors when choosing a method: their childbearing aspirations, their sexual behavior, their individual and family health history, their health habits and, perhaps most important of all, their willingness and ability to use a particular method consistently and correctly.

Three factors—multiple sexual relationships, smoking and irregular or incorrect method use—have particularly strong effects on whether a woman will be able to reach her reproductive and health goals. A sexually active woman who does not want to become pregnant greatly increases her chances of maintaining good health if she and her partner use contraceptives consistently and follow some general guidelines for the selection of a method. Couples should use barrier and spermicide methods when their relationship is not mutually monogamous or when one of them has an STD (for protection against infection, infertility and cervical cancer), use oral contraceptives at some time during the woman's reproductive years (for protection against ovarian and endometrial cancer), stay informed and aware of health conditions (such as high blood pressure) and behavior (such as smoking) that may contraindicate their use of particular methods, and rely on an extremely effective method once childbearing is completed.

Because pregnancy can affect women's health in numerous ways, the prevention of pregnancy has a significantly beneficial effect on women's health. Yet the virtual elimination of pregnancy-related complications by the most effective contraceptive methods—the pill, the IUD, long-acting hormonal methods and sterilization—is a benefit often overlooked when the health effects of methods are considered.

The reality of people's lives and of the methods available today make clear the continuing need for development of new methods of contraception that will involve fewer trade-offs between goals (for example, between prevention of pregnancy and protection against STDs). However, whether women—and couples—will be able to achieve their family planning goals in good health depends not only on the contraceptive method, but on the behavior of the individuals who use it. Behavioral change is difficult to achieve, but an important first step would be to encourage more honest, forthright consideration of the extent to which one's behavior interacts with the health effects of contraceptive methods. Women and men need to be more honest with themselves and with each other about possible exposure to sexually transmitted diseases that may have long-term consequences for each other's health and for the women's future fertility. Physicians and other medical providers should discuss sexual behavior and mechanics of contraceptive use with both female and male patients rather than assume that their patients are not exposed to infection or that they know and are able to use their chosen method correctly and consistently. A better sense of how current, or future, behavior might affect health and influence the effects of a contraceptive method can help women and men make choices about their behavior and select methods that are better tailored to their own concerns and goals.

Incorrect or inconsistent method use, smoking and exposure to STD infection through multiple sexual relationships may diminish the benefits of contraceptive use. But one conclusion is certain: The reproductive health of women who do not want to become pregnant is most threatened if they rely on chance rather than on a contraceptive method.

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Birth Intervals and Perinatal Health: An Investigation of Three Hypotheses

By Jane E. Miller

Summary

This analysis uses data from Hungary, Sweden and the United States to investigate the factors contributing to the high health risks observed among infants born within 12 months of the preceding birth. Three hypotheses for poor perinatal health are explored: confounding by prematurity, selection of high-risk mothers into short birth intervals and maternal depletion. Results show that prematurity accounts for the greatest share of the excess risks associated with closely spaced births, and for virtually all of the excess risk of late fetal death. After the confounding effects of prematurity are controlled for, the study finds that infants conceived within a few months of the preceding birth remain at higher-than-average risk of low birth weight, preterm birth and neonatal death. The results suggest that avoidance of birth intervals of less than two years could be expected to effect a 5–10 percent decreased risk of low birth weight and neonatal death.

Introduction

In recent years, a great deal of attention has been focused on whether family planning can play a significant role in the improvement of infant health.¹ The discussion has concentrated principally on two aspects of reproductive patterns, maternal age and birthspacing, although the influence of birth order has also received some

"Since short conception intervals appear to influence mortality in part through their effects on birth weight and gestation length, reducing the incidence of short conception intervals may [be effective in] improving perinatal health."

attention. A crucial issue in this debate is whether teenage childbearing or short birth intervals themselves have a detrimental impact on infant health, or whether poor outcomes can be explained by other risk factors, such as inadequate health care or low socioeconomic status, that are also associated with high infant mortality and young maternal age or close birthspacing.²

Studies of the relationship between teenage childbearing and higher-than-average infant mortality have generally concluded that most of the excess risk to infants born to young mothers can be explained by the socioeconomic characteristics of the mothers, and that there appears to be little if any biological risk associated with age itself, particularly for women aged 18 or older.³ These results imply that encouraging the use of family planning among teenagers to help them delay childbearing will have little impact on infant mortality unless these women are able to reduce their health risks by using prenatal care services, for example.

This article investigates a similar question about birthspacing. Short preceding birth intervals (the time between the previous and sampled births) are associated with higher than average mortality rates in both developing and developed countries.⁴ The similarity between the relative risks across such a range of countries and health conditions is striking: Mortality rates for infants born less than two years after the birth of a sibling are generally about twice as high as those for infants born 2–4 years after the preceding birth (the lowest risk group). The risks for in-

fants born less than one year after the preceding birth are even higher, with a mortality rate three to five times as high as those born after intervals of 2–4 years. (Infants born more than four years after their preceding sibling are at slightly higher risk than infants born 2–4 years later.)

We aim to address the following question: Is there a physiological association between the length of the preceding birth interval and perinatal health, or can most of that association be attributed to confounding by other factors such as prematurity* or the health behaviors and characteristics of women who have short birth intervals? Our analysis focuses on the late fetal and neonatal periods (from six months' gestation through the first month after birth), since biological effects of prenatal factors are most strongly reflected in health during the perinatal period.⁵

Data from Hungary, Sweden and the United States are used to investigate three hypotheses for the association between birth intervals and perinatal health. The first is that this association is confounded by prematurity, the second is that high-risk women are selected into short birth intervals and the third is that maternal

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*We use the term "prematurity" to refer to *preterm birth* (short gestation) rather than low birth weight, as is sometimes the case; until 1975, the standard World Health Organization definition of "premature" was based on birth weight rather than on duration of gestation. In this article, low birth weight is explicitly identified as such in all discussion, since it is an attribute that is distinct from, albeit strongly related to, gestation length.

nutritional depletion resulting from close spacing compromises infant health. In addition, we discuss the extent to which one can generalize the results obtained here to other populations and the policy implications of these results.

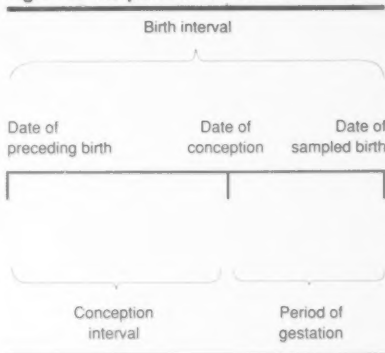
A previous study using data from Sweden and Hungary demonstrated that confounding by prematurity is considerable in the relationship between length of preceding birth interval and perinatal mortality, accounting for 65–90 percent of the excess perinatal mortality among infants born within 12 months of the preceding birth.⁶ This study extends previous work on this topic⁷ in several ways. First, rather than relying only on an event as rare as perinatal death, we now use four distinct indicators of perinatal health: late fetal mortality, birth weight, gestation length and neonatal mortality. These permit examination of possible mediating effects of birth weight and gestation in the relationship between birthspacing and perinatal survival and broaden the range of health outcomes considered.

This study investigates late fetal and neonatal mortality separately, to test for differences in the relationship between birthspacing and each of the two components of perinatal mortality. Furthermore, it includes data from the United States that allow direct testing for a relationship between birthspacing and risk of preterm birth, which was not possible with the data from Sweden and Hungary. The U.S. data also provide several socioeconomic, health history and health behavior variables that are significant predictors of perinatal health, including use of prenatal care services and weight gain during pregnancy. By using these data and incorporating measures of educational attainment and marital status for Sweden and Hungary, we present a more detailed investigation of selection of high-risk women as a possible explanation for the excess health risks associated with closely spaced births than was shown previously.

Examination of the Hypotheses

The first hypothesis—confounding by prematurity—is a crucial but often overlooked source of bias in the relationship between length of preceding birth interval and perinatal mortality. Since the period of gestation is not only part of the birth interval itself (Figure 1) but is also related to perinatal mortality, the association of short birth intervals with high mortality includes the strong inverse association between length of gestation and mortality.⁸ Therefore, confounding by prematurity is po-

Figure 1. Components of the birth interval



tentially a significant source of bias in the relationship between birth intervals and mortality; the proportion of preterm births (less than 37 completed weeks' gestation) among infants born less than one year after their preceding sibling is typically more than twice that observed in any other birth interval category.⁹

There are two reasons why a higher-than-average incidence of preterm births is to be expected among births that occur within a few months of the preceding birth. First, among infants conceived the same amount of time after a preceding birth, term births may be excluded from a particular range of birth intervals, while preterm births would not be, since preterm births will occur within a shorter period of time after a given date than term births. For example, a fetus conceived four months after the preceding birth and born after seven months' gestation (preterm) would be born within a year of that preceding birth, while another fetus conceived four months after a preceding birth and born after nine months' gestation (at term) would not. Second, the number of infants conceived rises rapidly in the first few months following a birth, as the proportion of women who have resumed ovulation increases. Thus, the number of conceptions eligible to contribute term births within less than 12 months of the previous birth is likely to be considerably smaller than the number eligible to contribute preterm births within the same period.¹⁰

As a result of these two forces, far more infants are at risk of preterm than term delivery within less than 12 months following a previous birth. In other words, the high proportion of premature births among infants born soon after the birth of a sibling may account for much of the excess mortality associated with short birthspacing. Failure to take into account these confounding effects of length of ges-

tation will yield misleading conclusions about the possible benefits to perinatal health of avoiding short conception intervals.

In addition to the confounding effect of gestation on the relationship between the length of the preceding birth interval and perinatal mortality, there may be an indirect (or mediating) effect of the length of the period between birth and conception on mortality. Such an effect could occur if infants conceived shortly after the preceding birth were more likely to be born prematurely than infants conceived after longer intervals. Since prematurity is associated with elevated mortality risks, infants conceived after short intervals would be at higher than average risk of dying as a result of the indirect effect of conception intervals acting through length of gestation. A direct effect of conception intervals on mortality risk implies that, regardless of gestational age, infants conceived within a few months of the previous birth are more likely to die than infants conceived after longer intervals.

The other two hypotheses—selection and maternal depletion—are concerned with the association between the length of the preceding conception interval and indicators of perinatal health once the confounding effects of prematurity have been removed.

The selection hypothesis suggests that the increased health risks observed among fetuses conceived shortly after the preceding birth are not attributable to short spacing per se, but to the overrepresentation in this group of women who are at high risk of bearing unhealthy infants for reasons other than short conception intervals.^{*} In other words, some other characteristic that is associated with both short conception intervals and poor health outcomes is responsible for the health risks observed among closely spaced births. For example, parents suffering a miscarriage, late fetal death or early infant death are more likely to conceive again soon after that event than parents of a surviving infant.¹¹ Further, mortality is correlated among siblings regardless of length of birth interval.¹² Since increased mortality risks for the sampled child and the short birth interval preceding its birth are both associated with such family characteristics, short intervals will appear to be related to poor outcomes if

*Although selection has been proposed in explaining the association between birth intervals and health, the role of selection in explaining the relations between conception intervals and health has not been investigated in previous studies.

Table 1. Four indicators of perinatal health, by length of preceding birth interval (in months), according to country

Country and indicator	Total	<12	12-17	18-23	24-35	36-47	48-59	>60
Hungary (N=77,256) (N=1,854) (N=10,043) (N=9,657) (N=15,451) (N=9,966) (N=8,035) (N=22,250)								
Neonatal mortality rate*	23.7	67.2	23.5	16.8	17.0	20.9	21.7	29.9
Late fetal mortality rate†	8.8	14.5	7.6	6.3	7.9	7.1	8.6	11.3
Birth weight <2500g (%)	10.8	23.6	10.9	9.8	9.2	9.8	9.7	12.0
Gestation <37 weeks (%)	19.2	31.8	20.0	18.8	17.7	18.0	17.5	20.3
Sweden (N=51,096) (N=1,175) (N=3,832) (N=5,621) (N=12,467) (N=9,453) (N=6,029) (N=12,519)								
Neonatal mortality rate*	5.9	15.2	12.2	6.6	4.0	5.0	6.2	5.3
Late fetal mortality rate†	6.4	8.4	8.5	6.0	4.4	5.7	6.9	8.1
Birth weight <2500g (%)	3.2	7.9	4.0	3.4	2.8	2.3	2.8	3.4
Gestation <37 weeks (%)	4.8	11.3	6.2	5.1	4.3	3.8	4.4	4.9
United States (N=4,290) (N=163) (N=699) (N=622) (N=1,017) (N=609) (N=365) (N=815)								
Neonatal mortality rate*	10.7	45.9	9.3	5.0	12.0	10.7	8.9	8.3
Late fetal mortality rate†	3.4	4.5	3.3	2.7	2.9	3.0	3.6	5.3
Birth weight <2500g (%)	6.8	20.8	7.6	6.1	5.9	5.9	4.9	6.6
Gestation <37 weeks (%)	10.9	19.1	14.6	9.6	12.3	6.5	8.3	10.1

*In this table and subsequent tables, the rate used for Hungary and Sweden is the number of infant deaths in the first seven days per 1,000 live births (the early neonatal mortality rate); the rate used for the United States is the number of infant deaths during the first 28 days per 1,000 live births.

†Late fetal mortality rate is the number of fetal deaths of at least 28 weeks' gestation per 1,000 total births (late fetal deaths and live births); U.S. late fetal mortality rates pertain to births to married women only.

the effects of prior familial mortality are not taken into account.

Another possible selection factor that should be considered is breastfeeding, since it affects both the conception interval and mortality risk. A short conception interval may indicate that the mother does not breastfeed extensively and thus that her infants are at higher than average risk of mortality. However, neonatal mortality (the segment of infant mortality considered in this analysis) is unlikely to be affected by whether or not the infant was breastfed. In addition, the mean duration of breastfeeding is very short in the populations studied here—only 3–6 months¹³—so breastfeeding is unlikely to constitute a significant source of confounding in the relationship between conception interval and perinatal health in these samples.

The maternal depletion hypothesis states that a close succession of pregnancies and periods of lactation worsens the mother's nutritional status because there is not adequate time for the mother to recover from the physiological stresses of the preceding pregnancy before she becomes subject to the stresses of the next pregnancy.¹⁴ The mother's poor health then increases the risk of preterm birth, intrauterine growth retardation and subsequent fetal loss.¹⁵ The maternal depletion hypothesis implies that short conception intervals cause these poor outcomes. Both direct and indirect effects of concep-

tion intervals on mortality, which were discussed previously, are consistent with the maternal depletion hypothesis.

The relative importance of each hypothesis in explaining the association of short birth intervals with high perinatal mortality has critical implications for the evaluation of health policy interventions. In particular, each of the three hypotheses described above—confounding by prematurity, selection of high-risk women into patterns of short birthspacing and maternal depletion—suggests a very different course of action. If the association of high mortality with short birth intervals is spurious, attributable exclusively to confounding by the length of gestation, then delaying conceptions would not yield the desired reduction in infant mortality. If the excess health risks associated with short conception intervals are attributable to confounding by characteristics of the mother, then a policy aimed at avoiding short conception intervals could not be expected to reduce infant mortality beyond the effects of programs designed to increase access to health services or improve nutritional status. However, if there is a causal, physiological relationship between spacing and infant mortality (as suggested by the depletion hypothesis) then a policy of encouraging the use of contraception or breastfeeding to increase the spacing between births would be an effective means of improving infant health.*

Since prematurity, maternal depletion and selection are not mutually exclusive, all three forces may be operating simultaneously to generate the observed associations among characteristics of the mother,

birthspacing and perinatal health. Factors that remain to be determined are the relative importance of the three explanations; whether selection of high-risk women into short conception intervals is occurring and, if so, the nature of the specific risk factors that identify those women; and the magnitude of the health risks attributable to short conception intervals once the effects of possible confounding factors have been taken into account.

Methods

This analysis is based on data from the 1973 World Health Organization (WHO) study of perinatal mortality for Hungary and Sweden and from the 1980 National Natality Survey (NNS) and National Fetal Mortality Survey (NFMS) for the United States. Although interest in the relationship between birthspacing and infant health has been focused on developing countries, these three countries were chosen for two reasons. First, information on the length of gestation—a critical variable for this analysis—is not available for many developing countries. Second, the relative risks of mortality for infants born after birth intervals of less than one year compared with those for infants born after longer intervals are as high in each of these countries as in many developing countries.

Information is derived from the birth certificate or fetal death record for each second-order or higher birth. For the United States, these data are supplemented by information on the maternity history, health behaviors and health care during pregnancy taken from two questionnaires completed by mothers in the sample. The

*In addition to the possible indirect effect of breastfeeding on mortality through birthspacing implied by such a policy, breastfeeding will reduce mortality via its direct effect on infant mortality.

original NNS and NFMS samples consisted of approximately one in 10 live births and one in three late fetal deaths, respectively. Details of the methods and response characteristics from these two surveys are described elsewhere.¹⁶ A high nonresponse rate on some items resulted in a varying number of cases available for the U.S. analysis. Imputed data from the original NNS/NFMS tapes were not used in this analysis; number of weeks of gestation was imputed based on number of months since last menstrual period and on birth weight.¹⁷

The samples for Hungary and Sweden include all recorded late fetal deaths and live births of second or higher order for whom the requisite information was available. The samples comprise 77,256 live births and 684 late fetal deaths for Hungary, and 51,076 live births and 327 late fetal deaths for Sweden. The data collection methods for these samples are described elsewhere.¹⁸

Birth spacing is measured by the length of the preceding birth interval (or length of the preceding conception interval in the case of the United States, where such data were available). The birthspacing measures are specified in categorical form to capture the nonlinear relationship between the length of the preceding birth interval and infant health, consistent with other studies of this relationship.¹⁹ Measures of perinatal health include birth weight, length of gestation, and late fetal and neonatal mortality.* Birth weight and length of gestation precede mortality in the model since they occur prior to a neonatal death and are strongly correlated with survival probability.²⁰ In addition, birth weight and gestation length are factors through which the effects on mortality of antecedent variables (such as conception interval or maternal characteristics) may be mediated.²¹

In our model, we specify that the length of the conception interval and perinatal health can both be affected by the mother's socioeconomic, "biodemographic" and health characteristics. Socioeconomic variables include educational attainment, marital status and race (in the United States), while the biodemographic variables consist of maternal age and number of previous live births. Health history variables include number of previous late fetal deaths, adequacy of prenatal care and weight gain during the sample pregnancy. Maternal characteristics may be related to conception interval length if they are associated with one or more of the proximate determinants of fertility. (Since our information on breastfeeding, contraceptive use

and marital disruption during the period prior to the conception is limited, our analysis is restricted to overall interval length rather than its determinants.) Maternal socioeconomic, biodemographic and health attributes may also be related to perinatal health apart from their relationships through birthspacing.²²

In the first portion of our analysis, we control for the effects of gestation (without controls for the effects of other variables such as mother's characteristics) to examine the confounding-by-gestation hypothesis. The second part of the analysis introduces controls for other possible confounding factors, to determine the importance of selection of high-risk mothers into short birth intervals.

Confounding by Prematurity

In each of the three countries studied, the risks of poor perinatal outcomes are markedly higher for infants born after short birth intervals. As shown in Table 1, infants born less than 12 months after the preceding birth are four times as likely to die in the neonatal period, twice as likely to suffer a late fetal death and 2–3 times as likely to be of low birth weight as infants born after intervals of 24–35 months.

The incidence of prematurity is 2–3 times as high among infants born less than 12 months after the preceding birth as among those born after longer intervals. As discussed previously, however, this pattern does not suggest that short birth intervals cause short gestation. Because the risks of late fetal death, neonatal death and low birth weight are all strongly and inversely related to length of gestation, we must control for the confounding effects of gestation length when evaluating the health risks associated with close birthspacing.

Logistic regression with and without controls for length of gestation was used to model the relationship between the length of the preceding birth interval and late fetal or neonatal mortality. Controlling for the effects of prematurity yields a marked decrease in the mortality odds among infants born within a year of the preceding birth in each of the three countries studied (Table 2): The relative odds of neonatal death for such infants (compared to those in the 24–35-month group) decrease from 4.2 to 1.8 in Hungary, from 3.8 to 1.7 in Sweden and from 5.2 to 2.9 in the United States. Controlling for the effects of prematurity removes essentially all of the excess risk of late fetal mortality in Hungary and Sweden, and yields a smaller but still substantial reduction in the United States. The reduction in risk of neonatal

Table 2. Among infants with birth intervals of less than 12 months, relative risks* of late fetal and neonatal mortality, with and without controls for gestation length, by country

Type of mortality and country	No controls	Controls for gestation
Neonatal death		
Hungary	4.17	1.82
Sweden	3.82	1.68
United States	5.15	2.86
Late fetal death		
Hungary	1.91	1.14
Sweden	1.91	1.02
United States	1.63	1.27

*Relative to infants with birth intervals of 24–35 months; the U.S. reference group is infants with birth intervals >12 months.

Notes: Relative risks for the two models with controls are estimated from logistic regression models with gestation entered as a categorical variable; categories are <28 weeks (live births only), 28–33 weeks and 34–36 weeks, with 37–42 weeks as the reference category. See reference 6 for a more detailed discussion of the specifications.

death among infants in the 12–17 month group is also considerable—nearly 45 percent in Sweden (not shown). Thus, among infants born within 18 months of the preceding birth, 55–76 percent of the excess neonatal mortality and 57–98 percent of the excess late fetal mortality can be attributed to the effects of prematurity.

To a great extent, the excess low birth weight among infants born after short birth intervals can also be explained by the higher incidence of prematurity among those born less than 18 months after another birth. One way of controlling for the effects of gestation on birth weight is to look at the percentage of infants who are small for their gestational age, which we classified as those with birth weights that were 90 percent of the median weight of infants born after the same duration of gestation. Based on birth-weight standards for each week of gestation from William Brenner and colleagues,²³ Table 3 (page 66) shows, for Sweden and the United States,† the percentage of infants who were small for gestational age by the length of the preceding birth interval. Comparing the figures in Table 3 with those in Table 1, it is apparent that the high incidence of prematurity in the shortest birth intervals is responsible for a substantial portion of

*For the United States, neonatal mortality (deaths during the first month of life) was used to provide an adequate number of deaths for analysis. For Hungary and Sweden, information was available on survival through the first week of life only.

†The gestational age data for Hungary were not considered to be suitable for standardizing based on the exact number of weeks because of reporting problems, such as heaping on even-numbered weeks.

the excess low birth weight in those groups. In Sweden, infants in the less than 12-month birth interval group are nearly three times as likely to be of low birth weight as those in the 24–35-month group (7.9 percent vs. 2.8 percent, as shown in Table 1), but only about 1.5 times as likely to be small for gestational age (10.2 percent vs. 6.7 percent, as shown in Table 3). The corresponding relative risks for low birth weight and small size for gestational age in the United States are 3.5 and 2.5, respectively.

Analysis of the U.S. data reveals an excess risk of preterm birth of approximately 45 percent among infants conceived shortly after the preceding birth: Among infants conceived within six months of the preceding birth, 14.6 percent are born prematurely, compared with 10.1 percent of those conceived 24–35 months after the preceding birth (not shown). In addition, evidence from a simulation* of the relationships among conception interval length, duration of gestation and birth interval length based on the Swedish data suggests that the risk of preterm birth is approximately 60–80 percent higher among infants conceived within six months of the preceding birth than among those conceived after longer intervals.²⁴ Combined with an estimate of the excess mortality risks associated with premature birth, these results suggest that the indirect effect of conception intervals on mortality operating through length of gestation is equivalent to an excess mortality risk of approximately 40 percent among infants conceived within six months of the preceding birth.

We emphasize, however, that simulations (described in our earlier work)²⁵ demonstrate that the incidence of preterm birth among infants born within 12 months of the preceding birth will be about twice as high as among infants born after longer intervals *even if the risk of preterm birth does not vary according to the length of the preceding conception interval*. As mentioned earlier, this results from the rapid increase in the number of conceptions with time, and from the exclusion of term births from the shortest birth intervals. Therefore, it is clear

Table 3. Percentage of infants who were small for gestational age,* by length of preceding birth interval, Sweden and the United States

Birth interval (in mos.)	Sweden	United States
Total	7.1	12.2
<12	10.2	22.5
12–17	7.7	15.0
18–23	7.1	12.7
24–35	6.7	9.3
36–47	6.7	11.5
48–59	6.6	13.4
>60	7.7	10.8

*Birth weight below 90 percent of the median birth weight for gestational age.

that the overall effect of *conception* intervals on mortality will be considerably lower than is suggested by the bivariate relationship between *birth* intervals and mortality. These findings underscore the need to control for the confounding effects of prematurity when evaluating the health impact of short preceding birth intervals, either by separating the period of gestation from the measure of birthspacing or by using gestation-specific measures of mortality or birth weight.

Despite the substantial reductions in risk that occur when the effects of gestation length are taken into account, fetuses conceived soon after the preceding birth are at higher risk of suboptimal health outcomes than other fetuses before the effects of other potential confounding factors have been controlled for. Infants born live who were conceived less than six months after the preceding birth are approximately 50–80 percent more likely to die during the neonatal period, to be born prematurely, or to be small for gestational age than are those conceived 2–5 years after the preceding birth. These patterns are observed in all three countries and among both black and white infants in the United States. There is also evidence of suboptimal fetal growth among stillborn infants conceived shortly after the preceding birth in both Hungary and the United States, but the relationship is not significant in Sweden.

Selection and Depletion

Because the association between birthspacing and perinatal health persists even when the effects of gestation have been controlled for, the two other hypotheses must be considered. The second hypothesis is that the poorer health outcomes among fetuses conceived shortly after the preceding birth may be explained by the overrepresentation of high-risk mothers in the short birth

interval groups. Multivariate analysis was used to investigate patterns of birthspacing and four measures of perinatal health (birth weight, preterm birth, neonatal and late fetal mortality) according to the maternal characteristics shown in Table 4. These patterns were investigated separately for black women and white women in the United States because prior studies have suggested significant differences in both birthspacing patterns²⁶ and health outcomes²⁷ by race.† For a given attribute to confound significantly the relationship between spacing and health, it must be strongly associated with both short birth or conception intervals and poor perinatal health. (Conception interval is the preferred variable; however, such data were available only for the United States, so birth intervals were used for Hungary and Sweden.)

There is evidence of significant overlap in the predictors of short birth intervals, low birth weight and prematurity in all three countries. Previous reproductive loss appears to be a particularly likely confounder, since it is associated with a markedly higher incidence of short birth or conception intervals and elevated risks of low birth weight and preterm birth among live births in both Sweden and the United States. In Sweden, for example, women who experienced a late fetal loss in their preceding pregnancy are nearly four times as likely to have another birth within 12 months and about 1.5 times as likely to have infants with low birth weight or short gestations as women whose preceding pregnancy resulted in a live birth.

Low educational attainment is also strongly associated with both short birth intervals and poor infant health: White women in the United States in the lowest educational group are twice as likely as women who have at least a high school education to have low-birth-weight infants, and about three times as likely to have short conception intervals. Short conception intervals are more than four times as common among black women with less than a complete high school education as among more educated blacks, but low educational attainment is only slightly associated with poor health. In Hungary, women in the lowest educational category are 1.5 times as likely as more educated women to have a short birth interval, 20 percent more likely to have a preterm birth, and more than twice as likely to have a low-birth-weight infant. Information on educational attainment was not available for Sweden.

Young mothers are particularly likely to

*Relationships between conception interval and prematurity could not be examined directly using the Swedish data because birth intervals were reported in grouped form, precluding calculation of exact conception interval length. Details of the simulation are presented elsewhere (see reference 6).

†Mortality rates were calculated for both races together because there was an insufficient number of deaths to permit separate analysis of mortality for blacks and whites.

have short conception intervals: In Hungary, women who were younger than 20 at the time of the sampled birth are more than 10 times as likely as women aged 25 or older to have had a short interval, while in Sweden the difference is fourfold.* Low-birth-weight infants are more common among young mothers in both countries (relative odds of 1.2 and 1.5 in Hungary and Sweden, respectively) but excess preterm birth is significant among births to teenage mothers only in Sweden (relative odds of 1.9); there were no teenage mothers with a second- or higher order birth in the U.S. sample for whom all necessary data were available. Mothers aged 20–24 years are somewhat more likely to have short conception intervals than are older mothers, but their children have fewer health risks (with the exception of a slight excess risk of preterm deliveries among U.S. blacks).

Infants born to unmarried women are more likely than those born to married women to be of low birth weight in all three countries and among both racial groups in the United States, and to be preterm among all groups except U.S. blacks. In addition, unmarried Swedish women and black American women are more likely than their married counterparts to have short conception intervals (relative odds of 1.2 and 1.6, respectively). Because short intervals are less common among unmarried white U.S. women than among the married (relative odds of 0.5), out-of-wedlock childbearing is unlikely to explain the association between short intervals and poor health among infants born to this group of women.

In the United States, black women with less-than-adequate prenatal care are 1.4 times as likely as black women with adequate care to have short conception intervals and about 1.6 times as likely to bear low-birth-weight infants. Adequacy of prenatal care was measured using the Kessner index.²⁸ White women with less-than-adequate care are 40 percent more likely than other white women to conceive again within six months of a previous birth, but are no more likely to bear unhealthy infants than white women with adequate care when the effects of other variables are taken into account. Among married women in the United States, weight gain during pregnancy was inversely related to both the incidence of short conception intervals and the incidence of low birth weight (not shown); information on weight gain was available for married women only. Information on prenatal care and mother's weight gain

Table 4. Relative risk of short birth or conception intervals and selected perinatal health outcomes, by country and characteristics of the mother

Country and characteristic	Short * interval	Birth weight <2500g	Gestation <37 weeks	Neonatal death	Late fetal death
Hungary					
Preceding fetal death	3.7	1.3	0.9	1.2	5.2
Incomplete 1st level ed.	1.5	2.1	1.2	0.9	1.9
Mother's age					
<20 years	10.1	1.2	1.0	1.0	0.5
20–24 years	3.2	0.9	0.9	0.8	0.6
Unmarried	1.1	1.9	1.5	1.3	1.4
Sweden					
Preceding fetal death	3.9	1.7	1.4	1.3	3.4
Mother's age					
<20 years	3.9	1.5	1.9	1.2	0.7
20–24 years	1.3	1.0	1.0	0.9	0.7
Unmarried	1.2	1.7	1.4	1.3	1.6
U.S. Whites					
Preceding fetal death	7.2	1.7	1.1	3.7†	3.0†
Education					
Grade school	3.0	1.8	1.3	1.7†	1.4†
Some high school	1.3	2.0	1.2	3.1†	1.5†
Mother's age					
20–24 years‡	1.9	1.0	1.0	1.0†	0.9†
Unmarried	0.5	1.6	1.2	1.1†	u
Less-than-adequate prenatal care	1.4	1.1	1.1	1.1†	1.4†
U.S. Blacks					
Preceding fetal death	2.2	2.1	1.1	†	†
Education					
Grade school	6.5	1.1	1.1	†	†
Some high school	4.2	1.3	1.5	†	†
Mother's age					
20–24 years	2.2	1.0	1.3	†	†
Unmarried	1.6	1.7	1.0	†	u
Less-than-adequate prenatal care	1.4	1.6	0.9	†	†

*For Hungary and Sweden, the variable is birth interval <12 months, and for the United States it is conception interval <six months. (Conception interval is the preferred variable, but was not available for Hungary and Sweden).

†Mortality rates shown for U.S. whites include infants of both races.

‡There were no mothers younger than 20 in the U.S. sample.

Notes: Reference categories are married, aged 25 or older, preceding pregnancy ended in a live birth, at least complete first level education (Hungary only), at least complete high school and adequate prenatal care (United States only); u=unavailable.

was not available for Hungary or Sweden.

Few characteristics of the mother for which we have information are significantly associated with neonatal mortality in the countries studied here. However, in all three countries, late fetal mortality is positively associated with low maternal educational attainment and a history of reproductive loss, and in Hungary and Sweden it is associated with out-of-wedlock childbearing.

This investigation has identified several factors that may potentially confound the relationship between conception intervals and perinatal health: Reproductive loss in the preceding pregnancy, low educational attainment, maternal age under 25 (particularly under 20), out-of-wedlock child-

bearing, low maternal weight gain during pregnancy and inadequate prenatal care are all associated with a high incidence of short conception intervals, preterm birth and low birth weight.

Controlling for the effects of mother's age, education, marital status and the outcome of the preceding pregnancy only slightly decreases the relative odds of neonatal mortality among Hungarian infants born less than 12 months after a previous birth—from 1.82 (after controlling for length of gestation, shown in Table 2) to

*Part of the reason for this pattern is that for a woman to have had two pregnancies before the age of 20 implies a fairly short interval between those pregnancies unless the woman was very young at the time of her first birth.

1.80—and increases the relative odds of fetal death from 1.14 to 1.23.* In Sweden, controlling for these variables slightly increases the estimated relative odds of neonatal death for infants in the less-than-12-month birth-interval group (1.68 to 1.78) and removes most of the remaining excess risk of late fetal mortality. The impact on birth weight of controlling for mother's characteristics is somewhat larger but still modest, accounting for approximately 15 percent of the excess low birth weight among infants born less than 12 months after a previous birth in Hungary and seven percent of the excess risk in Sweden (not shown).

It is difficult to assess the effects of controlling for maternal characteristics in the United States, since information on those variables was available for less than 60 percent of the total sample. Within the subsample of births for whom all information was available, the excess health risks observed among infants conceived within a few months of the preceding birth were not statistically significant, either with or without controls for the mother's characteristics.

Given the overlap between the factors associated with a higher-than-average incidence of short conception intervals and those associated with high risk of poor perinatal health, it is surprising that the selection hypothesis does not account for a larger proportion of the excess low birth weight and mortality among infants conceived shortly after the preceding birth. Closer examination of the group of women with short conception intervals reveals that women with one or more of the risk factors for suboptimal health outcomes contribute only about one-third of all birth intervals of less than one year in all three countries studied. In bivariate tabulations, mothers younger than 20 account for about 20 percent of short birth intervals in Hungary or Sweden, while women with one or more previous late fetal deaths account for an additional 5–10 percent. In the United States, unmarried blacks and blacks with less-than-adequate prenatal care contribute slightly more than one-fourth of short conception intervals, and approximately four percent of American women had suffered a late fetal loss in their preceding

pregnancy. Women with low educational attainment account for the remaining high-risk births among those with short conception intervals in Hungary and the United States.

From this appraisal it appears that no risk factor is sufficiently prevalent or strongly enough related to both incidence of short conception intervals and infant health to have a notable confounding effect on the relationship between conception intervals and health. For example, although a preceding late fetal death is associated with a markedly higher incidence of short conception intervals, its association with birth weight and preterm birth among live-born infants is much weaker. In addition, women with prior late fetal loss account for only a small percentage of short conception intervals, so the potential for confounding is fairly limited. Consequently, very little of the excess health risks observed among infants conceived shortly after the preceding birth can be attributed to selection of high-risk women into patterns of close birthspacing in these populations.

Because conception within a few months of the preceding birth remains associated with lower-than-average birth weight for gestational age and higher-than-average neonatal mortality in Hungary and Sweden, we cannot eliminate the possibility of maternal depletion as a residual explanation. Further analysis demonstrates that birth weight partially mediates the relationship between the length of the preceding conception interval and mortality: Since short conception intervals are associated with a higher-than-average incidence of low birth weight, we would expect that part of the excess mortality among closely spaced births could be accounted for by their less favorable birth weight distribution. Based on the results of a model in which both birth weight and gestation are controlled for (not shown), we conclude that the effects of birth weight account for 65 percent of the excess mortality in the less-than-12-month birth-interval group in Sweden and approximately 30 percent in Hungary, relative to the model with only gestation controlled. In other words, there is evidence of a substantial indirect effect of the length of the preceding conception interval on mortality, acting through the effect of conception intervals on birth weight.

There is also evidence that fetuses conceived shortly after the preceding birth are at higher than average risk of preterm birth, which suggests that gestation length may also act as a mediating factor in the

relationship between the length of the preceding conception interval and mortality. These findings are consistent with the results of other studies that have investigated the association between conception intervals and risk of preterm birth.²⁹ In addition to the indirect effects through birth weight and gestation length, there exists a direct effect of conception interval on mortality as well: The excess mortality that remains when the effects of gestation and birth weight have been taken into account implies that infants born within 12 months of the preceding birth have higher mortality rates than other infants, regardless of birth weight or gestational age. Because the control variables for the mother's characteristics may not be accurately measured or because there may be other confounding variables that are not included in the specification, it cannot be assumed that the residual "conception interval effect" can be wholly attributed to maternal depletion.

Discussion

In summary, the analysis conducted here demonstrates that the association between short birth intervals and poor perinatal health in these populations is explained by at least three different forces. The predominant influence is confounding by prematurity, which appears to be most strongly associated with late fetal death: Virtually all of the excess risk of late fetal death is explained by differences in the distribution of gestation lengths across birth interval groups, while differences in gestation are not sufficient to explain the excess risks of neonatal death, although the effect is substantial.

Examination of a wide range of socioeconomic and health history measures has demonstrated that selection of women at high risk of poor perinatal health outcomes into patterns of short birthspacing is responsible for an additional share of the excess low birth weight, but little or none of the excess mortality among infants conceived shortly after the preceding birth. Finally, there is indirect evidence of maternal depletion in both Hungary and Sweden, since infants conceived within a few months of the preceding birth have higher mortality and lower birth weight than infants born within 2–5 years of that birth, after other variables are controlled for. The evidence for the United States is less clear, since infants conceived within six months of the preceding birth are at no higher risk of perinatal death or low birth weight than other infants, according to the results of the multivariate specification, but the

*This increase in relative odds may be explained by the fact that the absolute risks of late fetal mortality decrease more for infants born two or more years after the preceding birth than for those born after shorter birth intervals when no other characteristics are controlled. This is because of the association of prior fetal loss and advanced maternal age with very long intervals and risk of late fetal loss.

number of cases that can be included in that analysis is far smaller than the original sample.*

Based on the magnitude of the effects demonstrated in this analysis, we calculate that elimination of conception intervals of less than 15 months could be expected to effect as much as a 5-10 percent reduction in neonatal mortality and the prevalence of low birth weight among second-order or higher births in the United States, Hungary and Sweden. An attributable risk of this size is not trivial, particularly in the context of developed countries, where reductions in infant mortality have slowed in recent years.³⁰ Much of the reduction in infant mortality during the 1970s has been attributed to improvements in survival probabilities for low-birth-weight, preterm infants brought about by the development of highly effective neonatal care.³¹ However, the prospects for additional reductions in gestation-related or weight-specific mortality appear limited. Consequently, health analysts advocate an emphasis on the prevention of prematurity and low birth weight as the most effective strategy for further reductions in infant mortality in developed countries.³² Since short conception intervals appear to influence mortality in part through their effects on birth weight and gestation length, reducing the incidence of short conception intervals may represent an effective means of improving perinatal health.

Our results, along with findings pertaining to the postneonatal consequences of short birth intervals,³³ suggest that a generalized policy aimed at improving access to family planning may be an important adjunct strategy for improving infant health. The potential health benefits that could result from wider birthspacing should be considered in conjunction with estimates of the costs and benefits of family planning and other health-related programs when evaluating how to allocate resources most effectively. Immunizations, dietary supplementation and prenatal and postnatal health care can directly affect health outcomes for mothers and infants, whereas family planning programs can influence them only indirectly, through what appear to be relatively modest causal relationships between fertility patterns and infant health. Therefore, our results

strengthen the arguments of analysts who advocate coordination of family planning services with other health services for women and children as the most appropriate strategy.³⁴

We also emphasize that the relative contributions of the three hypotheses considered here may differ depending on the population. In developing countries where inadequate nutritional intake is common, maternal depletion may have a more significant impact. In developed countries such as those studied here, selection may be the more important determinant, except possibly in the more impoverished subgroups. Breastfeeding patterns and the relative health benefits associated with breastfeeding, as well as the extent of confounding by prematurity, may also vary from one population to another. Because of these potential differences, further investigation of the relationships among birthspacing, gestation length, maternal characteristics and perinatal health should be undertaken in a variety of contexts before these conclusions can be generalized to developing countries, where the potential effect of family planning on infant health is of greatest concern.³⁵

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Consistency of Condom Use for Disease Prevention Among Adolescent Users of Oral Contraceptives

By Carol S. Weisman, Stacey Plichta, Constance A. Nathanson, Margaret Ensminger and J. Courtland Robinson

Summary

A six-month prospective study examined consistency of condom use for disease prevention among 308 adolescent women who had received a prescription for oral contraceptives at a family planning clinic. Only 16 percent used condoms consistently over a six-month period, yet 30 percent were considered at high risk for sexually transmitted diseases (STDs) because of multiple, sequential or concurrent relationships with male partners. The type of relationship in which the adolescents were involved did not predict consistency of condom use. Consistent condom use was associated with having asked a partner to use a condom, perceiving partner support for condom use, having less frequent sexual intercourse and using oral contraceptives inconsistently. The findings suggest that family planning providers need to more strongly emphasize to adolescents the importance of consistent condom use to protect against STD infection.

Introduction

With increasing recognition that female adolescents are at risk for contracting the human immunodeficiency virus (HIV) through heterosexual intercourse,¹ family planning providers are confronting the need to promote effective condom use among women in this age-group. Tradi-

The pattern of condom use among the adolescent study population indicates that the young women generally used condoms to prevent pregnancy, not STDs. The risk of disease transmission did not usually enter into their decision.

tionally prescribed to young women as a backup method to oral contraceptives, condoms are now regarded as an important prophylactic that should be used regularly, even by women using the pill, to protect against sexually transmitted diseases (STDs). Since condom use requires the cooperation of the male partner, clinic-based interventions to promote the use of condoms among adolescents must take into account the nature of sexual relationships. Our study examines the use of condoms by adolescent women during a six-month period, and explores whether consistency of use is associated with the types of sexual relationships young women are involved in.

Although there have been a number of studies of adolescent condom use, consistency of use over a number of instances of sexual intercourse or among adolescents engaged in different types of sexual relationships has not been examined using prospective research designs. Most studies have measured whether subjects ever used condoms or used them at first or last intercourse. For example, Freya Sonenstein and colleagues report on condom use at first and last intercourse in their cross-sectional national survey of sexually active males aged 15-19.² An important recent study of changes in adolescent condom use over one year reported whether or not subjects had ever used condoms during the month preceding the interview.³

Studies that do examine consistency of use often rely on subjects' summary assessments of consistency but do not control for frequency of intercourse. In a study of condom use among college women,

subjects reported "always," "almost always," "seldom" or "never" in response to the question, "When you have intercourse how often does your partner use a condom?"⁴ Similarly, a recent survey of 16-19-year-olds in Massachusetts reported that 34 percent of sexually active males and 26 percent of females reported "always" using condoms (as contrasted with "sometimes" or "never").⁵

Furthermore, there are no studies of condom use that look specifically at teenagers who are involved in multiple or short-term relationships or relationships with older men. Women in such relationships are considered to be at an increased risk for STD infection.⁶

The Study

The study on which this analysis is based was a three-wave panel study of adolescent women's contraceptive decision-making. In 1988, 430 unmarried, nonpregnant, 11-18-year-old clients of a Baltimore City Planned Parenthood clinic received a baseline interview immediately following a clinic visit. During the visit, they had obtained a prescription for oral contraceptives and received standard clinic instructions regarding use of condoms both as a backup contraceptive and for disease prevention, particularly against HIV. The women were contacted again for two follow-up telephone interviews at three-month intervals, and their clinic charts were reviewed at the end of the six-month follow-up period for information on STDs and pregnancies. Eighty-nine percent (382) of the baseline respondents completed both of the follow-up interviews.

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Table 1. Number and percentage of adolescent women and characteristics of their sexual relationships, by type of relationship

Type of relationship	N	%	Intercourse frequency*		% had older partner†	% had partner's support for condoms‡	% requested condom use§	% used condoms consistently**
			Mean	Standard deviation				
All	308	100	23.5	29.6	24	49	68	16
Single, stable partner	131	42	35.7	37.7	15	51	57	14
Single, short-term partner	85	28	8.4	10.1	16	48	81	24
Multiple, sequential partners	29	9	23.2	16.4	59	55	79	10
Multiple, concurrent partners	63	21	18.5	21.3	35	44	67	10

*Number of instances of vaginal intercourse during the six-month follow-up period. Main effect of relationship pattern is statistically significant ($p < .001$) by analysis of variance.

†A man at least five years older than the subject. The association between relationship pattern and having an older partner is statistically significant ($p < .001$) by the chi square test.

‡Reported at least one sex partner during the study period had favorable attitudes toward condoms, such as preferring condoms as a method of contraception.

§Ever asked a partner to use a condom because of concern about AIDS. The association between relationship pattern and requesting condom use is statistically significant ($p < .01$) by the chi square test.

**Used condoms in at least 90 percent of the time segments.

At the follow-up interviews, the adolescents were asked about their frequency of sexual intercourse (defined as vaginal intercourse) and the types of contraceptives used, if any. For each follow-up interview, the interviewer had a calendar of the three-month period following the adolescent's visit or last interview. The calendar was divided into six two-week segments, and the women were asked questions about occurrences within these segments. Thus, they did not have to remember what had occurred each day or even each week during the prior three months; rather, they were asked to recall behavior within a two-week margin of error. In addition, the interviewers cued the subjects to the time segments by using calendar dates and key events (e.g., the date of the initial clinical visit, holidays and birthdays).⁷

The women were asked about specific male sex partners in each of the time segments. These partners were assigned identification numbers so that they could be traced through the entire six-month follow-up period, and so that breakups and new partners could be identified. For each partner in each time segment, the interviewers obtained information on the number of instances of sexual intercourse and on whether or not a condom was used during that time segment. In addition, the women were asked questions regarding each partner's attitudes toward birth control and, specifically, toward condoms.

The present analysis focuses on the 308 adolescents who reported at least one instance of intercourse during the six-month

follow-up period. The average age of these women at baseline was 16, and they had an average of nearly 11 years of schooling. Seventy-seven percent were black, and 89 percent lived in the inner city.

The sexual histories revealed that, in general, the women were at high risk for unintended pregnancy and for STD infection. Their average age at first intercourse was 14.5, and their average total number of sexual partners was 2.9 (which translates into two partners per year of sexual activity). Over half (58 percent) had been pregnant (including 154 women who had had an abortion before being enrolled in the study); 12 percent reported ever having had an STD.

Measuring Condom Use

Consistency of condom use was determined by dividing the number of two-week time segments in which the woman's partner had used a condom by the number of time segments in which the subject had had sexual intercourse. (The subject's reported frequency of intercourse is analyzed as a covariate, as described later.)

On average, women reported having sexual intercourse in 6.5 of the 12 time segments and using condoms in 30 percent of these segments. (This is not a partner-specific measure of condom use, but rather a measure of overall use during a six-month period.) Fifty percent of the adolescents reported never having used condoms during the follow-up period, and 15 percent reported having used condoms in all of the time segments in which they

had had intercourse. For this analysis, the consistency of use is dichotomized so that the 48 subjects using condoms in at least 90 percent of the time segments are defined as "consistent condom users" (16 percent of subjects), and the 260 others are defined as "inconsistent condom users."

It is important to note that our measure of consistent condom use is not equivalent to a measure of condom use at last intercourse. In this sample, consistent condom use (as defined above) and using a condom at last intercourse are significantly associated ($r = .69$, $p < .001$). However, while all consistent condom users had used a condom at last intercourse, only about half of the subjects who had used a condom at last intercourse were classified as consistent condom users.

An advantage of our measure is that subjects may be less likely to overreport condom use when they are asked to report use with each partner over an extended period rather than use at only one instance of intercourse. Therefore, our method of collecting condom use data may be less subject to biases associated with social desirability than are measures of condom use at last intercourse.

To determine the validity of our measure of consistent condom use (because corroborating reports from sex partners were not available), we examined the association between condom use and three variables: pregnancy scares (defined as suspecting a pregnancy at any time during the follow-up period), pregnancies and new incidents of STDs. Consistent condom users were significantly less likely ($p < .05$) than inconsistent users to report any pregnancy scares (17 percent, compared with 30 percent) or to become pregnant during the follow-up period (two percent, compared with 11 percent). Of the 30 pregnancies that were self-reported or recorded in the clinic charts, only one occurred among the consistent condom users. There was no significant difference between consistent and inconsistent condom users for incidents of STDs (17 percent, compared with 13 percent), possibly because subjects tend to underreport STDs.

We also examined the relationship between consistent condom use and consistent oral contraceptive use. (Consistency of oral contraceptive use was calculated as the proportion of possible pill days on which pills were taken, dichotomized at a cut point reflecting the clinical significance of missed pills; 38 percent of the women were defined as consistent pill users.) Among consistent condom users, 25 percent were also consistent pill users, while

among inconsistent condom users, 41 percent were consistent pill users. This negative association between consistent condom use and consistent pill use ($p < .05$) suggests that inconsistent condom users (the majority of the adolescents) may have used condoms as a backup method to oral contraceptives, and that consistent condom users may have used condoms as their primary contraceptive method. In this sample, only 12 women (four percent) used condoms and oral contraceptives simultaneously and consistently.

Condom Use and Relationships

If a population of women were using condoms to prevent STDs, we would expect the consistency of condom use to vary according to the types of sexual relationships in which the women were involved. For example, since having relationships with multiple partners and switching partners frequently are presumed to place a woman at higher risk for disease, we would expect women in such relationships to use condoms more consistently than women in other types of relationships.

We identified four types of relationships in our sample. As shown in the first column of Table 1, the predominant type was a single, stable relationship: Forty-two percent of the women reported having had only one male sex partner throughout the entire study period (including at baseline). Twenty-eight percent reported having had a single, short-term relationship; these women either began a relationship during the six-month follow-up period or broke up with their partner during the follow-up period, or both.

The remaining adolescents reported having multiple sexual partners during the study period. Nine percent had had sequential partners—that is, had two or more partners over the six-month period but only one partner in any given two-week segment and never switched back and forth between partners. On average, these women had 2.1 partners over six months. Twenty-one percent had had multiple, concurrent partners—that is, had more than one partner in a two-week segment and/or switched back and forth between the same partners. These subjects had an average of 2.6 partners over six months. No subject reported having had more than six partners during the follow-up period.

We examined the different types of relationships with regard to frequency of intercourse, partner characteristics and condom use. As shown in Table 1, there were substantial differences among the types of relationships with regard to frequency of

intercourse. On average, the women had had about 24 instances of intercourse over the course of the follow-up, or about one per week. Adolescents in single, stable relationships reported having had intercourse most frequently, and those in single, short-term relationships had had intercourse least frequently. There was a wide degree of variation, however, in sexual activity within different types of relationships as shown by the standard deviations. Table 1 also shows that women who had had multiple partners were significantly more likely than other women to have had sexual intercourse with a partner who was at least five years older.

It seems reasonable to assume that consistent condom use is linked to the attitudes of partners toward condoms. Subjects were considered to have had partner support for condom use if any partner during the study period was perceived as having favorable attitudes toward condoms. Overall, one-half of the women reported having had a partner's support for condom use during the study period. However, partner support was not associated significantly with type of relationship.

A young woman's willingness to request condom use is an indicator of her potential skill in negotiating condom use with a partner. In each interview, the women were asked whether they had ever asked a partner to use a condom because of concern about AIDS. Overall, 68 percent of subjects reported having done so. Having asked a partner to use a condom was associated with the type of relationship: Women with single, short-term relationships or multiple, sequential partners were most likely to have requested condom use (81 percent and 79 percent, respectively); those in single, stable relationships were least likely to have done so (57 percent). Interestingly, requesting that a partner use a condom was not associated with partner support for condom use (not shown). Table 1 also shows that the type of relationship is not associated with consistency of condom use.

We used multiple logistic regression to analyze consistent condom use as a function of the variables discussed above. Consistency of oral contraceptive use was included as a control variable since condoms appeared to be used largely as a backup method in this sample of young women. Table 2 shows the results of this analysis. The coefficients reflect adjustment for age, race and mother's education, none of which were significantly associated with consistent condom use.

The odds of consistent condom use are increased fivefold when a young woman

Table 2. Regression coefficients, standard errors and adjusted relative odds, by variable predicting consistency of condom use

Variable	Regression coefficient*	Standard error	Adjusted relative odds	P-value
Had single, short-term partner†	0.03	0.42	1.03	.95
Had multiple, sequential partners†	-0.76	0.73	0.46	.29
Had multiple, concurrent partners†	-0.81	0.55	0.44	.14
Had intercourse $\geq$ once per week	-0.94	0.48	0.39	.05
Had older partner	-0.19	0.47	0.82	.68
Had partner's support for condoms	1.41	0.38	4.08	.00
Requested condom use	1.60	0.56	4.95	.00
Used pill consistently	0.73	0.40	0.48	.07
Intercept	-3.58	0.83	na	na

*Coefficients reflect adjustment for age, race, and mother's education.

†Single, stable relationship is the omitted reference category.

Note: Model Chi Square=52.00, $p < .001$; na=not applicable.

requests that her partner use a condom and fourfold when she has a partner who is supportive of condom use. In addition, the odds of consistent condom use are significantly decreased if the woman has intercourse at least once a week,* the odds of consistent condom use are also decreased if the woman is a consistent user of oral contraceptives ($p < .07$). Perhaps most important are the null findings: Neither the type of relationship nor the age of the partner significantly predicts consistent condom use.

A number of other predictors theoretically relevant to condom use were examined. These included considering condoms effective in preventing pregnancy and disease; perceiving oneself as at risk for HIV; ever having had an STD; not wanting to have a child in the next year; and ever having been pregnant. None of these variables was found to predict consistent condom use during the six-month follow-up period.

*Previous research, primarily with oral contraceptives, suggests that among adolescents, greater frequency of intercourse is associated with more consistent use of contraceptives. (See: R.H. DuRant and M.S. Jay, "A Social Psychologic Model of Female Adolescents' Compliance with Contraceptives," *Seminars in Adolescent Medicine*, 3:135, 1987; and B.W. Whitley, Jr., and J.W. Schofield, "A Meta-Analysis of Research of Adolescent Contraceptive Use," *Population and Environment*, 8:173, 1985-1986.) However, this may not be true of condom use, which is coitus dependent. For condom use, consistency may be more difficult to achieve if intercourse is more frequent and, in particular, if multiple partners are involved.

Discussion

Only 16 percent of the young women in our study used condoms consistently, yet 30 percent had sequential or concurrent multiple partners and were thus regarded as at high risk for STDs. There was no evidence that women in higher risk relationships were using condoms more consistently than those in less risky relationships. Furthermore, neither perceiving oneself as at risk for STDs nor believing condoms to be effective in preventing disease transmission was associated with more consistent use of condoms.

The results suggest that when these young women and their partners made the decision to use condoms, they did not consider their risk of contracting an STD. The pattern of condom use among these adolescents indicates that condoms were generally used to prevent pregnancy, not disease; 97 percent of the adolescents used oral contraceptives for at least part of the follow-up period, and consistent pill use was negatively correlated with consistent condom use. Condoms probably were not used more frequently because most subjects believed themselves to be protected from unwanted pregnancy by the pill.

A clear implication of this analysis is that family planning clinics need to better integrate pregnancy and disease prevention services for adolescents and to strongly encourage consistent use of condoms, whether or not oral contraceptives are being used. At the time these women were enrolled in the study, the clinic staff was informing clients about the risks of AIDS, recommending condom use and distributing free condoms. However, the findings suggest that consistent, simultaneous use of oral contraceptives and con-

doms cannot be expected among adolescent family planning clinic patients unless there is a more systematic program to educate young women about the need for consistent condom use and the skills required to use them.

In particular, adolescents need to be able to identify the types of relationships that place them at higher risk for STDs. Providers must explain to their clients that if they have only one partner at a time but the succession of partners is fairly rapid, the relationships are not monogamous. Young women must also understand that even if they have only one, stable partner, the partner might not be monogamous or might be exposed to HIV through intravenous drug use. While these partner attributes were not measured here, they are clearly important in assessing personal risk.

Another implication of this analysis is the need for clinic-based interventions that help young women develop communication skills so that they can ask and, if necessary, persuade a partner to use a condom, or refuse intercourse if a partner resists condom use. Having asked a partner to use a condom was the strongest predictor of consistent condom use among these subjects, and the perception of partner support was the second strongest.

Women in relationships that they perceive as long term and monogamous may have a special need for communication skills to help them in implementing condom use, since the introduction of condoms into a relationship where they have not been used previously may be seen as a threat to the relationship and as an implication that sexual activity is going on outside the relationship.⁸ This may be reflected in our finding that women in single, stable

relationships were least likely to request that their partner use a condom.

Development of communication skills might be brought about most effectively in small peer groups in which both sexes participate. Participation in such groups may help young women and men break down the barriers of communication between them. Mixed gender groups may also help shift the responsibility for STD prevention from the woman, who does not ultimately control condom use, to the couple.

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Characteristics of U.S. Women Having Abortions, 1987

By Stanley K. Henshaw, Lisa M. Koonin and Jack C. Smith

Summary

In 1987, as in earlier years, women having abortions were predominantly white (65 percent), younger than 25 (59 percent), and unmarried (82 percent). A majority had no previous live births (53 percent), and most had no previous abortions (58 percent). About half the abortions were performed before nine weeks of gestation, and 97 percent were curettage procedures, usually suction curettage. Comparisons with 1980 data reveal a six percent decline in the U.S. abortion rate after changes in age, race and marital status within the population are controlled for; however, the decline occurred only among the white population and not among minority races. Among teenagers aged 15–19, the abortion rate declined slightly for whites and increased for minorities. The rate also increased among women younger than age 15.

Introduction

The number of induced abortions in the United States has stabilized since 1980, at about 1.6 million each year.¹ The stability in total numbers, however, may mask significant changes in the use of abortion among some subgroups of women, such as teenagers and minorities. Such trends, measured by changes in abortion rates, are important components in the study of reproductive behavior, and are useful indicators of the extent and effectiveness of contraceptive practice in preventing unde-

The overall abortion rate has been declining since 1980, but not all groups are part of this trend. Rates have increased among unmarried whites younger than 15, unmarried minorities aged 15–19, and married minorities aged 20–24.

sired pregnancies. Changes in abortion rates among population subgroups might also reflect social developments such as increased sexual activity among unmarried teenagers,² changes in contraceptive practices (including decreased use of IUDs and increased reliance on condoms and sterilization³), and varying availability of abortion services.

Comprehensive national information on trends in the characteristics of women having abortions and in the abortion rates of subgroups was last published for the years 1982–1983.⁴ This article updates that information to 1987 and analyzes the trends since 1980. We look first at age, race and marital status, with particular attention to teenagers. We then examine trends in the number of prior live births and abortions, weeks of gestation and type of abortion procedure used. Finally, we examine data on the state of residence of women obtaining abortions. Where possible, we assess the extent to which trends may be attributable to such factors as changes in the demographic makeup of the population and rates of sexual activity among young, unmarried women.

Methods

Our calculations are based on three data sources. The numbers of abortions performed nationally and in each state were derived from surveys, conducted by The Alan Guttmacher Institute (AGI), of all known abortion providers. The most recent survey counted 1,559,000 abortions performed in 1987.⁵ Despite the difficulty in identifying abortion providers and obtaining their cooperation, this survey is

estimated to represent at least 94 percent of all abortions.⁶

We used information on the characteristics of women having abortions in 1986 and 1987 that was collected by the Centers for Disease Control (CDC) from the central health agencies of 43 states and the District of Columbia, as well as from hospitals and other medical facilities in seven states.⁷ Although the CDC reports fewer abortions than the AGI because of incomplete reporting in many states (13 percent fewer in 1987), these data contain information—on the demographic characteristics of abortion patients, their periods of gestation and the type of procedures performed—that is unavailable from the AGI survey. The number of states reporting characteristics of women obtaining abortions varies by characteristic. For example, in 1987, data on age (the characteristic with the most complete reporting) were available for 39 states and the District of Columbia, whereas data on weeks of gestation (the characteristic with the least complete reporting) were available from 35 states and the District of Columbia.

In keeping with past practice, the percentage distributions obtained from the CDC data have been adjusted to remove the influence of extraneous year-to-year changes in data sources; this was accomplished by calculating the year-to-year change in the percentage distribution of a characteristic, using only those states with comparable information for both years. A state was omitted from the calculation if it provided no data on the characteristic for one or both years, if the proportion “unknown” changed by four or more percent-

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Table 1. Number and percentage distribution of legal abortions in 1987; rate of abortions per 1,000 women and ratio of abortions per 100 live births plus abortions, 1980 and 1985-1987; by characteristic

Characteristic	N	%	Rate*				Ratio†			
	1987	1987	1980	1985	1986	1987	1980	1985	1986	1987
Total	1,559,110	100.0	29.3	28.0	27.4	26.9	30.0	29.7	29.4	28.9
Age										
<20	406,790	26.1	44.4	45.7	44.4	45.0	41.2	42.1	41.8	41.6
<15	16,090	1.0	8.4	9.2	9.2	9.9	42.7	45.7	43.8	43.9
15-19	390,700	25.1	42.9	43.8	42.6	43.2	41.1	42.0	41.7	41.5
15-17	167,280	10.7	30.2	30.7	30.0	30.8	42.4	43.2	42.9	42.8
18-19	223,420	14.4	61.0	63.0	61.9	61.8	40.1	41.0	40.7	40.5
20-24	516,340	33.1	51.4	52.3	52.2	52.3	30.1	31.5	31.5	31.2
25-29	333,420	21.4	30.8	30.9	30.9	30.4	21.8	22.0	22.0	21.4
30-34	188,920	12.1	17.1	17.8	17.9	17.7	23.3	21.8	21.5	20.8
35-39	91,660	5.9	9.3	9.7	9.7	9.7	37.2	32.2	31.9	30.1
≥40	21,980	1.4	3.5	2.9	2.8	2.8	51.7	49.4	46.2	44.3
Race										
White	1,017,310	65.2	24.3	22.6	21.8	21.1	27.4	26.5	25.9	25.2
Other	541,800	34.8	56.8	55.5	55.9	56.0	39.2	39.7	39.8	39.3
Marital status										
Married	275,170	17.6	11.3	9.7	9.4	9.2	9.8	8.8	8.8	8.7
Unmarried‡	1,283,940	82.4	49.7	47.3	46.4	45.6	64.9	60.5	58.9	57.1

*In this and subsequent tables, denominator for ages <20 is number of women aged 15-19; for ages <15, denominator is number of 14-year-old females; for ages ≥40 denominator is number of women aged 40-44. Denominator for total and for race and marital status subgroups is women aged 15-44.

†In this and subsequent tables, denominator is number of abortions plus live births six months later (to match times of conception for pregnancies ending in births and pregnancies ending in abortions), both adjusted to age of woman at time of conception.

‡In this and subsequent tables, refers to the never-married, separated, divorced or widowed.

Sources: **Number of abortions**—AGI abortion provider survey. **Distribution by characteristic**—see reference 7; data have been adjusted to assure comparability between years. **Rates and ratios**—for 1980, S.K. Henshaw and K. O'Reilly, "A Portrait of American Women Who Obtain Abortions," *Family Planning Perspectives*, 17:2, 1985. For 1985-1987, number of women: U.S. Bureau of the Census, "U.S. Population Estimates, by Age, Sex, Race, and Hispanic Origin: 1989," *Current Population Reports*, Series P-25, No. 1057, 1990; — "Marital Status and Living Arrangements, March 1985," *Current Population Reports*, Series P-20, No. 410, 1986; — "Marital Status and Living Arrangements, March 1986," *Current Population Reports*, Series P-20, No. 418, 1987; — "Marital Status and Living Arrangements, March 1987," *Current Population Reports*, Series P-20, No. 423, 1988. **Number of births**—National Center for Health Statistics, "Advance Report of Final Natality Statistics," *Monthly Vital Statistics Report*, for 1985, Vol. 36, No. 4, Supplement, 1987; for 1986, Vol. 37, No. 3, Supplement, 1988; for 1987, Vol. 38, No. 3, Supplement, 1989; for 1988, Vol. 39, No. 4, Supplement, 1990.

age points between the two years, or if the state changed the definition or data source for the characteristic between the two years (for example, if the determination of gestational age changed from reported last menstrual period to the physician's estimate). Because of these adjustments, the percentage distributions published here differ slightly from those published in the CDC abortion surveillance reports.

We estimated the number of abortions obtained according to state of residence by multiplying the CDC data on state of residence by the ratio of the AGI count of abortions occurring in that state to the CDC count. For states where the CDC had not collected data, the AGI surveyed a sample

of abortion facilities to estimate the proportion of abortions provided to out-of-state women and to determine the states from which the women had come.

Our national estimates of the characteristics of abortion patients assume that the abortions reported to the state health departments are typical of those abortions in states without centralized reporting and of the unreported abortions in states with incomplete reporting. Support for this assumption comes from a nationally representative survey of 9,480 abortion patients that was conducted in 1987.⁸ The characteristics of the women surveyed correspond closely to our national estimates.*

A third source of information on abortion is the National Center for Health Statistics (NCHS), which compiles data on all abortions reported to the state health statistics agencies of cooperating states (14 states in 1987). The NCHS periodically publishes an analysis of their abortion data

in a report that, although based on only about one-fifth of the abortions performed nationally, includes cross-tabulations not available elsewhere.⁹

To estimate the distribution of abortions by race according to age, we applied iterative proportional fitting¹⁰ to calculate cell percentages that are as close as possible to the percentages in the CDC's age-by-race table, but that add up to the AGI's national estimates of the separate age and race distributions. We used the same procedure to estimate the age-race-marital status distribution; the cell percentages used as the standard were taken from a three-way table published by the NCHS.¹¹

We used special tabulations on sexual history from the 1982 and 1988 National Surveys of Family Growth (NSFG) to calculate abortion rates per 1,000 teenagers who have ever had sexual intercourse. We estimated the percentage who had had intercourse in 1987 by straight line interpolation between the 1982 and 1988 percentages.

Two measures of abortion incidence are used: the rate of abortions per 1,000 women in a subgroup, and the ratio of abortions per 100 live births plus abortions. The latter ratio is the percentage of pregnancies (excluding miscarriages and stillbirths) ending in abortion. It reflects the decisions of women who become pregnant, and is influenced by the proportion of pregnancies that are unintended and how these are resolved, and by the number of desired births. Therefore, a subgroup may have a high abortion ratio because the women terminate most unintended pregnancies, because they have many unintended pregnancies, because their rate of intended births is low, or because of a combination of these factors.

The ratios of abortions per 100 births plus abortions, according to the woman's age, are adjusted to the presumed age at conception. To make this adjustment, we set the age of the woman at the time of an abortion back by three months and the age at birth back by nine months.¹²

National Results

As in the past, women having abortions in 1987 were predominantly young, white and unmarried. As Table 1 shows, 26 percent were teenagers, 33 percent were aged 20-24, 21 percent were aged 25-29 years, and 19 percent were aged 30 or older. Sixty-five percent were white, and 82 percent were unmarried (never married, separated, divorced or widowed).

• **Rates.** In 1987, there were about 27 abortions per 1,000 women of childbearing age

*For example, the greatest absolute difference between the estimated percentages of abortions within age groups is 0.9 percentage points for women aged 25-29 (21.4 percent in this age-group as estimated from the CDC data, compared with 22.3 percent derived from the AGI survey). This difference is within the survey's sampling error.

(15-44), down from 29 per 1,000 recorded in 1980. The change in rates may have been caused by shifts in the population as well as by changes in use of abortion by subgroups. In particular, the aging of the "baby boomers" may have reduced the abortion rate, because women over age 25 have lower abortion rates than younger women. An increased proportion of women who are unmarried at a given age or who are of minority races would tend to create a higher abortion rate, however, and these two population shifts almost balanced: The eight percent decline in the abortion rate between 1980 and 1987 fell to six percent when standardized on the age-race-marital status distribution of the 1987 population (not shown).

The abortion rate in 1987 was highest among women aged 18-19 (62 per 1,000) and fell sharply with age. The concentration of abortions among young women may be attributed to several factors: less effective contraceptive use among those under age 30 (including more nonuse, less use of sterilization,¹³ and higher failure rates¹⁴) decreasing fecundity with age,¹⁵ a desire to delay childbearing, and greater coital frequency.¹⁶

Marked changes in abortion rates have occurred among women at both ends of the age spectrum. Among women younger than 15, the abortion rate increased by 18 percent between 1980 and 1987. The number of abortions in this age-group also increased from 15,300 to 16,100, while the number of 14-year-old women in the population decreased by 214,000.¹⁷ The abortion rate of women aged 40 and older fell by 20 percent during the same time period.

Table 2. Abortion rate and abortion ratio, by race, according to age and marital status, 1987

Age and marital status	Rate		Ratio	
	White	Other	White	Other
Age				
<20	37.3	78.1	41.7	41.5
<15	5.8	26.4	u	u
15-19	36.3	73.0	u	u
20-24	41.3	103.2	27.7	40.9
25-29	23.2	66.0	17.3	36.1
30-34	13.5	38.8	16.9	35.3
35-39	7.6	21.0	26.1	42.8
≥40	2.2	6.2	41.2	53.7
Marital status				
Married	6.9	27.6	6.8	19.2
Unmarried	38.2	71.1	61.7	50.1

u=unavailable.

Sources: **Number of abortions**—see reference 2; adjusted by an iterative proportional fitting to the age, race and marital status distributions shown in Table 1. **Numbers of women and births**—see sources for Table 1.

Table 3. Estimated number of abortions, abortion rate and abortion ratio, by age, according to marital status and race, 1987

	Married			Unmarried		
	Total	White	Other	Total	White	Other
NUMBER						
All ages	275,170	182,950	92,220	1,283,940	834,360	449,580
<15	310	200	110	15,790	7,290	8,490
15-19	12,880	9,970	2,910	377,820	256,840	120,980
20-24	71,760	49,560	22,100	444,580	286,340	158,240
25-29	82,240	52,820	29,420	251,180	158,540	92,640
30-34	62,680	40,150	22,530	126,240	80,100	46,140
35-39	35,430	23,430	12,000	56,230	36,910	19,320
≥40	9,870	6,720	3,150	12,110	8,340	3,770
RATE						
All ages	9	7	28	46	38	71
<15	u	u	u	10	6	26
15-19	32	27	u	44	37	73
20-24	22	17	75	67	55	109
25-29	13	9	38	55	46	86
30-34	9	6	26	37	32	51
35-39	5	4	16	21	19	26
≥40	2	1	5	5	5	7
RATIO						
All ages	9	7	19	57	62	50
<20	6	5	11	53	59	45
20-24	8	7	18	57	62	51
25-29	7	6	18	59	63	54
30-34	9	7	20	61	64	56
35-39	16	13	28	67	69	63
≥40	30	27	42	73	74	70

Note: u=unavailable, or number of married women for the denominator is too small to be stable.

Sources: **Number of abortions**—see reference 9; adjusted by iterative proportional fitting to the 1987 totals shown in Table 1. **Numbers of women and births**—see sources for Table 1.

Among white women, the abortion rate fell from 24 per 1,000 women in 1980 to 21 per 1,000 women in 1987. The abortion rate among women of black and other races changed little over the period; it is much higher than that of white women (2.7 times as high in 1987). Minority women have proportionately more unintended pregnancies,* and these pregnancies lead to both more abortions and more unplanned births.¹⁸ The higher rate of unplanned pregnancies among minorities is caused in part by greater proportions of women who are not using a contraceptive method¹⁹ and in part by higher contraceptive failure rates.²⁰ The difference in the abortion rate between whites and minorities may be partly attributable to economic differences, since abortion rates are negatively associated with income.²¹

Married women were much less likely to have an abortion (nine per 1,000 women in 1987) than were unmarried women (46 per 1,000), perhaps because married women are more likely to be seeking pregnancy and more likely to practice contraception—especially sterilization, which is the most effective method.²² Young and

unmarried women find it more difficult to plan their contraceptive use, since intercourse is less predictable for them. Since 1980, abortion rates have fallen among both married and unmarried women.

Ratios. The national abortion ratio in 1987 was 29 abortions per 100 pregnancies ending in birth or abortion, slightly lower than the ratio of 30 in 1980. The ratios were highest for teenagers (42) and for women aged 40 and older (44), because women at these ages are most likely to want to avoid childbearing.²³ Since 1980, the ratio has been steady among teenagers, has risen slightly among women aged 20-24, and has fallen significantly among women aged 30 and older. The decrease among women aged 30-39 reflects higher rates of childbearing in this age-group rather than reduced rates of abortion.²⁴

The abortion ratio among women of minority races (39) was 56 percent higher than the ratio among whites (25) in 1987. The ratio among minority women has

*The term "minority" is used here to refer to minority races (black and other races), not to ethnic minorities such as Latinos.

Table 4. Abortion rate, birthrate and pregnancy rate per 1,000 women aged 15-19, by race, 1980-1987

Race and measure	1980	1981	1982	1983	1984	1985	1986	1987
All races								
Abortion rate	42.9	43.3	42.9	43.5	43.2	43.8	42.6	43.2
Birthrate	53.3	52.7	52.6	51.7	50.9	51.3	50.6	51.1
Pregnancy rate*								
Age at outcome	111.2	110.8	110.3	109.9	108.6	109.8	107.6	108.8
Age at conception†	127.6	128.5	127.4	125.9	126.9	127.5	124.9	126.9
White								
Abortion rate	38.3	38.5	38.1	38.2	37.9	37.8	35.9	36.3
Birthrate	45.0	44.7	44.5	43.6	42.5	42.8	41.8	41.9
Pregnancy rate*								
Age at outcome	96.1	96.0	95.2	94.3	92.7	92.9	89.7	90.2
Other								
Abortion rate	66.0	66.1	65.5	67.9	67.1	71.1	72.5	73.0
Birthrate	94.7	91.3	90.7	89.3	89.0	89.7	89.7	90.9
Pregnancy rate*								
Age at outcome	186.3	182.3	180.9	181.9	180.6	185.8	187.4	189.4

*Includes estimated number of pregnancies ending in miscarriages and stillbirths.

†Based on births six months later than abortions, to match time of conception for births and abortions; ages reduced by nine months for births and three months for abortions.

Sources: 1980-1983—see reference 4. 1984-1987—joint distributions by age and race from the CDC (see reference 7 and earlier volumes), adjusted by iterative proportional fitting to the age and racial distributions estimated by the AGI; numbers of women and births: see sources for Table 1.

changed little since 1980, while among white women it has declined somewhat from a 1980 figure of 27. There is a wide disparity between the ratio among unmarried women (57) and among married women (nine), although the abortion ratios of both married and unmarried women have fallen since 1980.

• *Age-race interrelationships.* A more detailed comparison of abortion use reveals that the pattern of abortion rates by age was similar for whites and minorities, except for the rate among minorities under age 15, which was particularly high (Table 2, page 77): Whereas for the other age-groups, the minority rates are two to three times the rates for whites, among minorities younger than 15, the rate was 4.6 times the rate for whites.

Minority teenagers have higher abor-

tion rates than do whites (78 and 37 per 1,000, respectively), but once pregnant, white and minority teenagers are about equally likely to terminate their pregnancies by abortion, as the ratio of 42 abortions per 100 pregnancies indicates. From age 20 on, however, minorities are more likely than whites to terminate a pregnancy by abortion.

• *Race-marital status interrelationships.* The use of abortion differs by marital status more among whites than among minorities: The abortion rate of unmarried white women was 5.5 times that of married white women, but the rate among unmarried minority women was 2.6 times that of married minorities. Abortion ratios show a similar pattern.

At all ages, among both white and minority women, most abortions were obtained by those who were unmarried (Table 3, page 77). While abortion rates were also lower for married women than for unmarried women, some subgroups of married women had rates at or above the national average, including white women under age 20 and minority women under age 30.

• *Age-marital status interrelationships.* Rates fell with age among married women of both racial groups. The same pattern held for unmarried women, except that teenagers had lower rates than women aged 20-24. Minorities had higher rates than whites among both married and unmarried women of all age-groups.

The age pattern of the abortion ratio was the reverse of that of the rate: The ratio increased with age within the four race and marital status groups, so that when marital status was taken into account, young women, even teenagers, were less likely than older women to terminate a pregnancy by abortion.* Among unmarried women in all age-groups, those of minority races were less likely to terminate a pregnancy by abortion than were white women, possibly because nonmarital childbearing is more accepted in minority communities.†

• *Trends.* Although the overall abortion rate has been declining since 1980, not all races, age-groups or marital-status groups are part of this trend. Rates increased at least 10 percent among three groups: unmarried whites younger than 15 (from five abortions per 1,000 women younger than 15 in 1980 to six per 1,000 in 1987), unmarried minority adolescents aged 15-19 (from 66 abortions per 1,000 minority adolescents aged 15-19 in 1980 to 73 per 1,000 in 1987), and married minorities aged 20-24 (from 54 per 1,000 married minority women in 1980 to 75 per 1,000 in 1987).

However, there were major declines in the abortion rate among married women older than 25. Among white married women aged 25-29, for example, the rate fell from 11 abortions per 1,000 women in 1980 to nine per 1,000 in 1987, and among married minority women of the same age, the rate fell from 42 abortions per 1,000 women in 1980 to 38 per 1,000 women in 1987. There were also major declines among white unmarried women. Among those aged 20-24, the rate fell from 64 abortions per 1,000 women in 1980 to 55 per 1,000 in 1987; among those aged 25-29, the rate fell from 54 abortions per 1,000 women in 1980 to 46 per 1,000 in 1987; and among those aged 40 and older, the rate fell from six abortions per 1,000 women in 1980 to five per 1,000 in 1987.

Teenagers

Among teenagers, the abortion rate per 1,000 women increases sharply up to age 18 and then levels off. Following are data for 1987:

Age	Rate	Rate (sexually active)
15-19	43	83
15	16	61
16	31	91
17	45	90
18	62	92
19	61	79

Among young women who are sexually

*The figures in Table 3 reflect marital status at the time of the birth or abortion, not at the time of conception. Some unmarried women who become pregnant marry before giving birth; if the births were classified according to marital status of the mother at conception, the abortion ratio of young unmarried women would be lower and that of young married women higher.

†For example, special tabulations of the 1988 General Social Survey conducted by the National Opinion Research Center show that 43 percent of minority adults, compared with 24 percent of white adults, were neutral about or disagreed with the statement, "People who want children ought to get married." Similarly, 57 percent of minorities and 34 percent of whites agreed that "A single mother can bring up her child as well as a married couple." These differences are statistically significant ($p < .001$).

active (including those who are married), however, the abortion rate is constant from age 16 to age 18 and falls somewhat at age 19. The abortion rate for teenagers aged 15-19 rose during the 1970s (not shown), but remained stable after 1980 at 43 to 44 abortions per 1,000 women (Table 4). The birthrate declined slightly during the 1980s, from 53 in 1980 to 51 in 1987. The pregnancy rate, which is a combination of the birthrate and abortion rates with an adjustment for miscarriages,* declined slightly from 111 pregnancies per 1,000 women aged 15-19 in 1980 to 109 pregnancies per 1,000 in 1987. (When calculated according to age at conception, the pregnancy rate is somewhat higher because most of the births and some of the abortions reported by women aged 20 are included as conceptions for women aged 19.)

Among white adolescents aged 15-19, abortion rates, birthrates and pregnancy rates all declined between 1980 and 1987. The pregnancy rate among this group declined by six percent, from 96 to 90 pregnancies per 1,000 women, even though more of these young women were sexually active in 1987 than in 1982.²⁵ The abortion rate among white women aged 15-19 who had ever had intercourse fell from 85 abortions per 1,000 women in 1982 to 71 per 1,000 in 1987 (not shown), a drop of 16 percent. The pregnancy rate of this group also fell, from 212 pregnancies per 1,000 sexually active women to 176 pregnancies per 1,000.

Among minority women aged 15-19, on the other hand, the abortion rate increased 11 percent, from 66 abortions per 1,000 women in 1980 to 73 abortions per 1,000 women in 1987. The birthrate fell from 1980 to 1984, then rose slightly in 1987. The pregnancy rate dropped to a low of 181 pregnancies per 1,000 women teenagers in 1984, then rose five percent to 189 pregnancies per 1,000 in 1987. Among those who had ever had intercourse (not shown), the abortion rate in 1987 was 130 abortions per 1,000 women, the birthrate was 162 per 1,000 minority teens, and the pregnancy rate was 338 pregnancies per 1,000. The proportion sexually active did not change between 1982 and 1987, so trends among sexually active minority teenagers were exactly the same as those among all minority women aged 15-19.

Other Characteristics

In 1987, 53 percent of abortion patients had had no births, down from 55 percent in 1985 and 58 percent in 1980 (Table 5). In part, this change reflects the aging of the

Table 5. Number of abortions in 1987 and percentage distribution of abortions for 1980 and 1985-1987, by selected characteristics

Characteristic	N	% distribution			
		1987	1980	1985	1986
Live births					
0	820,920	57.9	54.9	54.3	52.6
1	359,730	19.6	22.0	22.4	23.1
2	247,540	13.9	15.1	15.2	15.9
3	87,900	5.3	5.3	5.4	5.6
≥4	43,020	3.3	2.7	2.7	2.8
Prior induced abortions					
0	900,630	67.1	59.5	58.6	57.8
1	415,990	24.0	26.2	26.5	26.7
2	155,820	6.3	9.4	9.7	10.0
≥3	86,670	2.6	4.9	5.2	5.5
Weeks of gestation*					
≤8	792,270	51.0	51.1	51.5	50.8
9-10	416,740	26.6	26.8	26.4	26.7
11-12	194,460	12.9	12.4	12.3	12.5
13-15	90,700	5.1	5.7	5.8	5.8
16-20	55,910	3.5	3.5	3.5	3.6
≥21	9,030	0.9	0.5	0.5	0.6
Method*					
Instrumental evacuation†	1,510,760	95.0	97.3	96.6	96.9
Saline instillation	15,660	2.9	1.6	1.3	1.0
Prostaglandin instillation	7,620	0.9	0.4	0.4	0.5
Hysterotomy/hysterectomy	300	0.1	0.0	0.0	0.0
Other‡	24,770	1.1	0.7	1.7	1.6
Total	1,559,110	100.0	100.0	100.0	100.0

*Figures for weeks of gestation and method are not exactly comparable with those published for earlier years, when it was assumed that half of the abortions not reported to the CDC were performed in nonhospital facilities during the first trimester by curettage. This assumption was not made for the present calculations; in addition, more detailed categories for method are shown with year-to-year changes calculated back from 1987.

†Suction and sharp curettage; includes dilatation and evacuation.

‡Includes instillation procedures not reported in a specific category and procedures reported as "other," some of which may be combination procedures.

Sources: see sources for Table 1.

childbearing population. The proportion of women with no prior abortions fell from 67 percent in 1980 to 60 percent in 1985, and to 58 percent in 1987. This trend is a result of the growing proportion of women who have had an abortion in the past and are therefore at risk of having another.²⁶ A contributing factor may be that the "baby boomers" are now in the 25-to-35 age-group, when repeat abortions are most common.

The information on the number of prior abortions allows us to estimate the number of women who have ever had one or more legal abortions. As of 1987, 13.9 million women had had an abortion since the procedure was legalized nationally by the *Roe v. Wade* decision in 1973, and 15.1 million women had had an abortion since the states began to liberalize their laws in 1967. By the end of 1990, an estimated 16.6 million women had had an abortion since 1973, and an estimated 17.8 million since 1967.

Abortions are safest early in gestation.²⁷ In 1987, about half of all abortions were performed less than nine weeks after the onset of the woman's last menstrual period. Ten percent were performed after 12 weeks, and fewer than one percent occurred later than 20 weeks after the last menstrual period.

From 1973 until around 1980, greater availability of services made it possible for abortions to be performed at increasingly early points in gestation.²⁸ Since 1980, the gestational age at which abortions have occurred has remained generally stable except for a decrease of one-third in the proportion of procedures done after 20 weeks and an increase of 15 percent in the

*Miscarriages are estimated to equal 10 percent of abortions plus 20 percent of births. These proportions attempt to account only for pregnancies that miscarry after lasting long enough to be noted by the woman (six to seven weeks after the last menstrual period). See H. Leridon, *Human Fertility: The Basic Components*, University of Chicago Press, Chicago, 1977, Table 4.20.

Table 6. Number of abortions provided and number and percentage provided to nonresidents; number of abortions obtained by residents and number and percentage obtained out of state; and resident abortion rate per 1,000 women 15-44, by state, 1987

State	Provided in state			Obtained by residents			Resident abortion rate
	Total	To nonresidents		Total	Out of state		
		N	%		N	%	
Total	1,559,110	100,630	6	1,549,310*	90,830*	6	26.7
Alabama	19,630	1,480	8	21,160	3,010	14	21.8
Alaska	2,560	0	0	2,800	240	9	21.5
Arizona	22,130	1,700	8	21,400	970	5	27.3
Arkansas	7,030	190	3	8,490	1,650	19	15.8
California	300,830	1,430	†	301,100	1,700	1	45.1
Colorado	18,850	1,350	7	17,710	210	1	21.1
Connecticut	22,380	970	4	22,880	1,470	6	30.0
Delaware	5,680	1,460	26	4,570	350	8	28.9
District of Columbia	25,840	12,910	50	13,760	830	6	84.4
Florida	80,560	7,820	10	73,820	1,080	1	28.6
Georgia	36,030	2,870	8	34,840	1,680	5	22.5
Hawaii	11,290	100	1	11,210	20	0	43.8
Idaho	1,980	120	6	2,590	730	28	11.2
Illinois	72,180	2,210	3	73,380	3,410	5	26.7
Indiana	14,750	480	3	20,020	5,750	29	15.2
Iowa	8,900	530	6	10,090	1,720	17	15.7
Kansas	11,430	4,540	40	7,570	680	9	13.4
Kentucky	11,550	4,390	38	9,240	2,080	23	10.4
Louisiana	16,550	1,540	9	16,880	1,870	11	15.7
Maine	4,950	1,100	22	4,120	270	7	14.7
Maryland	31,240	1,970	6	39,720	10,450	26	35.1
Massachusetts	41,490	1,600	4	43,130	3,240	8	29.8
Michigan	61,060	1,600	3	60,440	980	2	27.1
Minnesota	17,810	1,920	11	16,600	710	4	16.4
Mississippi	5,430	600	11	7,120	2,290	32	11.7
Missouri	20,190	2,390	12	23,190	5,390	23	19.6
Montana	3,280	910	28	2,440	70	3	13.2
Nebraska	6,580	1,300	20	5,670	390	7	15.5
Nevada	10,710	1,240	12	9,900	430	4	40.6
New Hampshire	4,680	620	13	5,740	1,680	29	21.8
New Jersey	63,570	1,940	3	66,350	4,720	7	36.4
New Mexico	6,650	280	4	7,620	1,250	16	21.3
New York	184,420	7,340	4	179,700	2,620	1	42.2
North Carolina	37,630	2,610	7	36,390	1,370	4	23.4
North Dakota	2,560	1,220	48	1,540	200	13	10.2
Ohio	51,490	3,140	6	49,350	1,000	2	19.3
Oklahoma	11,000	790	7	11,150	940	8	14.7
Oregon	14,370	1,250	9	13,530	410	3	20.5
Pennsylvania	51,800	2,710	5	53,330	4,240	8	19.4
Rhode Island	7,390	1,730	23	6,000	340	6	25.4
South Carolina	12,770	600	5	14,810	2,640	18	17.7
South Dakota	860	110	13	1,410	660	47	9.0
Tennessee	22,050	4,040	18	19,640	1,630	8	16.8
Texas	100,210	4,520	5	97,030	1,340	1	23.9
Utah	4,830	450	9	4,660	280	6	11.9
Vermont	3,690	1,130	31	2,830	270	10	20.7
Virginia	34,410	1,900	6	38,860	6,350	16	26.4
Washington	29,840	1,940	7	29,120	1,220	4	26.2
West Virginia	2,990	220	7	4,240	1,470	35	9.7
Wisconsin	18,330	1,300	7	18,770	1,740	9	16.7
Wyoming	680	70	10	1,400	790	56	11.8

*Excludes an estimated 9,800 abortions obtained by nonresidents of the United States; about 2,940 of these were obtained by Canadians, 2,420 by Mexicans, and most of the remainder by residents of the Caribbean area.

†Fewer than 0.5 percent.

Sources: **Number of abortions**—AGI survey and data compiled by the Centers for Disease Control. **Number of women**—U.S. Bureau of the Census, "State Population and Household Estimates with Age, Sex, and Components of Change: 1981-88," *Current Population Reports*, Series P-25, No. 1044, 1989.

proportion done at 13-15 weeks. An increase during the 1980s in the proportion of clinics that will perform abortions past 12 weeks²⁹ and an increase in the use of dilatation and evacuation procedures may have affected the number of abortions at 13-15 weeks.

In 1987, 97 percent of abortions were performed by instrumental evacuation—either suction or sharp curettage. Sharp curettage was reported in only four percent of abortions (not shown); some of these, as well as some of the reported suction curettage abortions, may have been performed by a combination of suction and sharp curettage. About two percent of all abortions were performed by intrauterine instillation of hypertonic saline or prostaglandin. "Other" procedures may include other instillation methods and combination procedures, many of which may be sharp and suction curettage. The use of instillation for second-trimester abortions has been partially replaced by instrumental evacuation since 1980. The number of abortions by hysterectomy or hysterotomy has diminished to insignificance.

Approximately 91,000 abortions were performed outside the woman's state of residence in 1987 (Table 6). This figure equals six percent of all abortions obtained by U.S. residents, about the same as in 1985.³⁰ In Wyoming, 56 percent of abortions obtained by residents took place outside the state; in seven other states, more than 25 percent of the abortions obtained by residents occurred outside the state.

In a few states, the proportion of residents obtaining abortions outside of their state of residence appears to have been influenced by the discontinuation of services by a few major providers. The clearest example is South Dakota, where a drastic reduction in the availability of providers was accompanied by a doubling of this proportion between 1985 and 1987 and by a reduction in the resident abortion rate. We estimate that increases of more than five percentage points between 1985 and 1987 in the proportion of residents obtaining out-of-state abortions occurred in South Dakota (24 points), New Hampshire (14 points), Idaho (eight points), Alabama (seven points), and West Virginia (seven points).

The abortion rate for residents of the District of Columbia (84 abortions per 1,000 women) is higher than the rates for residents of any state, but is probably comparable to the rates of other cities with similar size and population structure. The states with abortion rates of 30 or more are

California (45), Hawaii (44), New York (42), Nevada (41), New Jersey (36), Maryland (35), and Connecticut (30).

Discussion

Patterns in the use of abortion have remained stable over time, with most abortions obtained by women under age 25, unmarried women and white women. There have been some notable changes, however, in the overall abortion rate and in the rates among subgroups; the causes of some of these changes are of interest.

After controlling for changes in the age, race and marital status of the population, we found, for example, that the six percent decline in the overall abortion rate since 1980 was not caused by a reduction in the rate of unintended pregnancy. Using data from the 1982 and 1988 National Surveys of Family Growth, other researchers have also found a reduction in the proportion of unintended pregnancies ending in abortion (50 percent in 1987 compared with 54 percent in 1982, excluding miscarriages) but no change in the rate of unintended pregnancy between 1982 and 1987.³¹ We cannot determine the exact reasons for the abortion rate decline; it could be attributed to reduced access to abortion services or changed attitudes toward abortion as well as toward carrying unplanned pregnancies to term.

One of the subgroups that has experienced significant declines in abortion rates since 1980 is married women aged 30 and older, increasing proportions of whom are relying on female or male surgical sterilization.³² White unmarried women in their 20s have also reduced their abortion rate; in this group, increasing use of oral contraceptives and condoms could be a factor,³³ as could greater societal acceptance of nonmarital childbearing.

White teenagers experienced a small reduction in abortion rates in spite of an increase in the proportion who are sexually active.³⁴ The drop is especially notable because a larger proportion of the adolescents in 1987 were unmarried than in 1980 and therefore at higher risk of having an abortion. The pregnancy rate per 1,000 sexually active white women aged 15-19 also fell. The results of the 1988 NSFG suggest that these declines can be explained by increased contraceptive use: For example, the proportion of non-Hispanic white women 15-19 who used a contraceptive method at first intercourse rose from 55 percent in 1982 to 69 percent in 1988.³⁵ Although we do not know the precise reasons for increases in contraceptive use, among the factors that may have con-

tributed are sex education, fear of AIDS and other sexually transmitted diseases, and a desire among more teenagers to postpone childbearing.

On the other hand, the abortion rate increased among minority adolescents. Until 1984, this increase was more than equaled by a falling birthrate, but from 1985 to 1987, the abortion rate and the birth rate—and therefore the pregnancy rate—also increased. These results contrast with findings from the NSFGs that show sharply increased contraceptive use by non-Hispanic black teens at first intercourse.³⁶ Thus, the gap in ability to prevent pregnancy is widening between minority and white adolescents aged 15-19. Unmarried minority women aged 20-39 also experienced increases in abortion rates, as did married minority women aged 20-24.

Abortion rates and birthrates also increased among women younger than 15. The increases probably reflect in part the growing rate of sexual activity among young adolescents; among 15-year-olds, the proportion sexually active rose from 21 percent in 1982 to 28 percent in 1988,³⁷ a percentage increase greater than both the abortion and birthrate increases.

While there is overall stability in the characteristics of women having abortions, the recent trends of increasing rates of pregnancy and abortion among women younger than 15 and among some subgroups of the minority population are matters of concern.

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Special Report

State Legislation on Reproductive Health in 1990: What Was Proposed and Enacted

By Terry Sollom

Introduction

In 1990, state legislatures across the United States considered more than 1,500 measures related to abortion, family planning, sterilization, teenage pregnancy, infertility, new reproductive technologies, maternal and child health care, sexually transmitted diseases (STDs), and AIDS.* Legislation carried over from 1989 comprised one-quarter of all bills up for consideration in 1990. Despite the large number of measures relating to reproductive health that were introduced, there was a general lack of action in the state legislatures in 1990, primarily a result of election-year distractions coupled with budgetary constraints. Only 120 bills actually were approved, and 20 of these were later vetoed. What follows is a summary of state legislative activity—and inactivity—in 1990.

Abortion

Abortion was one of the most important topics for proposed legislative action; 465 abortion-related bills were introduced by state legislators, three times as many as in 1989. The profusion undoubtedly stemmed from the 1989 U.S. Supreme Court decision in *Webster v. Reproductive Health Services*, which gave states more authority to restrict access to abortion services.

Although sweeping antiabortion proposals aimed at prohibiting most abortions were introduced in several legislatures for the first time in a dozen years, only a handful were seriously considered in 1990, and none became operational. Most legislatures that dealt with abortion at all chose to act in a now-familiar pattern, chipping away at the edges of abortion rights in-

stead of attempting to ban abortion outright.

The anticipated effect of the *Webster* decision may have been dampened by election-year realities. Although some lawmakers wanted to act on *Webster* (or go even further, to provoke another Supreme Court review of legal abortion), others took heed of the November 1989 gubernatorial elections in New Jersey and Virginia, which were won by vocally prochoice candidates. In the end, state lawmakers generally kept to the familiar middle ground.

Most of the abortion-related bills received little floor action, and many legislatures adjourned without even taking them up at the committee level. Nine antiabortion bills were passed—about the same number as in previous years—but only two of these became law, with five others vetoed, one enjoined by a federal court and another not enforced. In addition, three abortion rights bills were approved; two became law and one was vetoed.

No measures proposing restrictions similar to those upheld in *Webster*—requirements for fetal viability testing, prohibitions on the use of public facilities and employees for abortion-related services, and declarations that life begins at conception—were enacted.† Also, antiabortion measures that would have required spousal notification and detailed informed consent and that would have prohibited abortion for purposes of gender selection were introduced, but none was passed.

• *Abortion bans* constituted four of the nine antiabortion bills passed by state legislatures in 1990. Single measures in Guam‡ and in Idaho and two bills in Louisiana were designed to ban abortion throughout pregnancy in all but the most restricted circumstances. Guam's law, passed unanimously by the mostly Catholic, unicameral legislature and signed by Governor Joseph Ada, outlawed all abortions except when the pregnancy would endanger the

woman's life or gravely impair her health; criminal penalties applied to persons performing, obtaining or soliciting an abortion. Just days after its approval, the law (the most restrictive such measure approved since abortion became legal) was enjoined, and is now pending before a U.S. appeals court; the case could reach the Supreme Court as early as fall 1991.

The Idaho bill, which was vetoed by Governor Cecil Andrus, would have permitted abortion only in cases where the woman's physical health is threatened, in cases of profound fetal deformity and in cases of rape and incest (if reported to the authorities). The bill provided for fines against doctors who violated the provisions or against women who attempted self-abortion. In his veto message, the governor said that the reporting requirements for rape and incest were too stringent.

During summer 1990, the Louisiana legislature twice sent to Governor Buddy Roemer legislation that would have banned most abortions and would have applied criminal penalties to persons performing illegal abortions. The first bill would have permitted abortion only in cases of life endangerment; in vetoing it, Roemer stated that he could not in good conscience forbid women who were pregnant as a result of sexual assault from obtaining a legal abortion.

After failing to override the veto, the legislature sent him a second bill that

*Six state legislatures (in Arkansas, Montana, Nevada, North Dakota, Oregon and Texas) did not convene sessions in 1990.

†In fact, only one such piece of legislation has been approved since *Webster* (in Pennsylvania, in 1989), and all of its *Webster*-like provisions were permanently enjoined by a federal appeals court in August 1990. The case is now pending before a U.S. appeals court; it could then be appealed to the Supreme Court, where, if accepted, it may be heard in fall 1991.

‡Guam is an unincorporated territory subject to jurisdiction by U.S. federal courts.

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added exceptions for "forcible" rape (with stringent reporting requirements) and for incest, although in both cases abortion would have been legal only in the first trimester. Roemer vetoed that bill as well, and admonished the legislature that they had treated rape "unevenly and unsatisfactorily" and that the reporting requirements were "uncaring, unworkable and unrealistic." Although the second bill had been passed by more than a two-thirds majority, the legislature declined to hold a special session to consider an override.

A joint nonbinding resolution adopted by the Utah legislature declared that the state's position on abortion should favor childbirth over abortion and that the state attorney general should support other states' legal actions opposing abortion rights. A legislative task force was established to study the abortion issue further and to make recommendations for legislative proposals for the 1991 session.*

•**Abortion rights** bills were introduced in 21 legislatures in 1990 in response to *Webster* and to preempt any further erosion of reproductive rights. The 55 measures were designed to ensure the availability of legal abortion in those states no matter what actions are taken by the Supreme Court, to provide state funding for abortion services for low-income women and to protect abortion providers and clients from anti-abortion harassment. Three were passed: Two are being enforced, while the third was vetoed.

In Connecticut, a bill signed by Governor William O'Neill made abortion a legal right under state law, even if the Supreme Court were to reverse *Roe v. Wade*. The law, which became effective October 1, also repealed criminal abortion statutes not enforced since 1973. A similar bill was passed by the New Hampshire legislature, but was vetoed by Governor Judd Gregg; an override attempt failed. Contrary to his veto of the Idaho antiabortion bill, Governor Andrus signed a measure repealing criminal penalties against abortion providers and against women seeking abortion. Also repealed was a "trigger" provision enacted in 1973 that would have made abortion illegal in Idaho should the Supreme Court overturn *Roe*.

After a week of tortuous maneuvers in February 1990, abortion rights legislation failed in the Maryland House. A filibuster by antiabortion senators had held up action on appropriations bills and on adjournment. To break the stalemate, the senate eventually compromised by passing a bill guaranteeing a right to abortion and a companion bill severely restricting abor-

tion. If the house had approved the pair, the issue would then have been settled by the voters in a referendum. However, a house committee voted down the compromise immediately after receiving it.†

•**Parental consent or notification** has been a subject of great state legislative activity in the past, and 1990 proved no different. Over 70 parental involvement bills were introduced in 25 states, but only three (all consent bills) were passed—two in Michigan (one vetoed, one enacted) and one in South Carolina. Early in summer 1990, the Supreme Court, in ruling on parental notification laws from Minnesota and Ohio, found that states may require notification of both biological parents of minors seeking abortion and may also require a waiting period, as long as the law also provides a judicial bypass procedure. As a result, current court injunctions against consent or notification laws may be lifted sometime in 1991 in seven states.

For the past two years, opponents of compulsory consent and notification laws have been promoting modifications such as lowering the age limit (now typically 18 years), allowing consent to be obtained from a grandparent or another adult relative, requiring intensive counseling by a licensed health practitioner or counselor or by clergy (instead of parental consent or notice) and making parents who withhold consent for a daughter's abortion legally or financially responsible for her baby until the daughter reaches age 18. For example, the South Carolina law requires consent from one parent or from a grandparent for minors younger than 17 and mandates parental responsibility for the minor's offspring should consent be withheld. (During 1990, several other legislatures also considered modified parental involvement bills.) The Connecticut reproductive rights law described previously was introduced as a notice measure, but as approved, it requires a physician or counselor to provide a pregnant adolescent younger than 16 with objective information to help her decide about the pregnancy, to offer alternatives to abortion and to encourage the adolescent to involve her parents in decision-making about the pregnancy; it does not require parental consent or notice.

The first consent bill to be passed by the Michigan legislature was vetoed in February. Among other things, it would have required one-parent consent for unemancipated minors under 18 or a waiver of consent from a judge. It also mandated that at the start of every school year, local school districts give written information on the consent law (developed and distrib-

uted by the state department of education) to each pupil in grades 6–12. In August, state election officials certified the validity of 192,000 signatures on antiabortion petitions asking the legislature to vote on the issue again,‡ and in September both the house and senate approved an initiative identical to the vetoed bill. The law was scheduled to become effective in March 1991; however, a lawsuit challenging the restrictions has been filed.

•**Public funding** of abortion caused controversy during 1990 in state legislatures in California, New York, North Carolina and West Virginia, all of which had provided state funds for abortion for low-income women in 1989; however, no funding restrictions resulted. The most significant action occurred in West Virginia, where the legislature and Governor Gaston Caperton approved new budget language restricting funding except for life endangerment or the threat of permanent, catastrophic physical injuries; for grave, permanent and irremediable fetal mental or physical defects; or for pregnancy resulting from sexual assault or incest reported to the authorities prior to the abortion. However, the state attorney general later issued an opinion that the restrictions were unconstitutional, and the governor decided not to enforce them.§

The North Carolina House, on Governor James Martin's recommendation, voted to slash the state abortion fund and to restrict eligibility. However, the senate's position in favor of full funding and no new restrictions prevailed in conference. In New York, both the assembly and the senate defeated efforts to defund state

*In November 1990, the task force unveiled its recommendations: A bill was introduced and signed into law in January that prohibits abortion except in cases of life endangerment, fetal deformation so severe that the fetus would not survive childbirth, grave medical risk to the pregnant woman, and reported rape or incest.

†In February 1991, the Maryland legislature approved a bill that codified the holdings of *Roe*. The new law guarantees the right to abortion until the point of fetal viability, and beyond that point if the life or health of the woman is endangered or if the fetus is deformed. It also includes a one-parent notice requirement, but allows a physician to bypass the notice requirement if he or she believes that the teenager is mature enough to make the abortion decision or that it would be in the adolescent's best interest to avoid notifying a parent.

‡This kind of citizen-sponsored legislative initiative does not permit gubernatorial review, hence it bypasses the governor's veto. The same procedure was used in 1988 to eliminate public funding for abortion in Michigan, but that law was ruled unconstitutional by a state court in February 1991.

§In March 1991, the legislature again passed the funding restriction, but the attorney general's 1990 opinion still stands, and the restriction will not be enforced.

Medicaid abortions. In California, where for the past 13 years the legislature has voted to restrict funding and the state courts have ordered it to be provided, both houses passed the state budget with full funding of abortions without restrictions.

•**Clinic licensing** legislation (generally intended to place stringent, even prohibitive, regulations on the provision of abortion services in outpatient facilities) received more attention than usual in 1990, with 18 such bills introduced. Mississippi Governor Ray Mabus vetoed licensing legislation that he considered too vague; it would have given the state health department broad authority to regulate abortion clinics.* A senate committee in Tennessee rejected a bill to repeal an onerous 1989 clinic licensing law that the state attorney general had found unconstitutional. The Alabama House passed a measure requiring clinics to carry \$1 million in malpractice insurance and post a \$10,000 cash bond, but the senate voted it down.

A moderate licensing bill was passed by the Florida Senate, but the legislature adjourned before the house could consider it. At the same time, the state asked a federal district court judge to review a 1982 injunction against punitive abortion clinic regulations, arguing that *Webster* now gave the state greater latitude. The judge denied the request, ruling that he would permit tighter regulation only when the state could prove that clinics pose a threat to their patients' health.

Family Planning Services

The surge of attention given the abortion issue after the *Webster* decision had a concomitant impact on family planning issues, by generating renewed interest among some legislators in helping women of all ages prevent unintended pregnancies. For the first time in several years, numerous reproductive rights measures designed to protect and advance access to contraceptives and to family planning services were introduced. Although none of these bills was enacted, this kind of legislation is expected to be reintroduced in 1991.

•**Funding** of family planning services is the biggest direct contribution that state legislatures make to contraceptive availability. More states than ever (40, at last count) provide some funds for family planning services for low-income women and teenagers, either through special legislative appropriations or through allocations of state health funds. Nevertheless, controversies and legislative battles still occur.

In Pennsylvania, the senate passed a \$2 million appropriation for family planning

services. Although the house did not act on that request before adjournment, it did defeat a proposal from Governor Robert Casey for a \$2 million "alternatives to abortion" program. (That program would have allocated equal amounts for "family planning" and for prenatal care but would have paid only for contraceptive counseling, medical testing and adoption counseling, while specifically barring spending for contraceptive devices and abortion counseling.) In Arizona, which only recently began funding family planning services under its equivalent to the Medicaid program, Governor Rose Mofford approved a measure that permanently prohibited the use of state funds for abortion counseling.

For two years, the California legislature and Governor George Deukmejian were entangled in a controversy over family planning funds. In summer 1989, the governor slashed the family planning appropriation for fiscal 1990 by two-thirds, cutting \$20 million from the program. At the time, the legislature did not have the votes to override his line-item veto, but in January 1990 it approved a measure restoring the funding. This action was taken after 50 family planning clinics were closed and after a state court ordered the full \$20 million to be reinstated. The governor allowed the measure to pass into law without his signature, and the lawsuit against the state was dropped.

•**Sterilization-related** legislation was approved in Georgia, where Governor Joe Frank Harris signed a measure repealing a requirement that a spouse provide written consent to his or her partner's sterilization. Among other sterilization bills introduced but not acted on, one in South Carolina would have prohibited lawsuits against health care providers for failing to obtain spousal consent for sterilization, and one in New York would have forbidden employers from requiring employees or applicants to be sterilized as a condition of employment in a work environment hazardous to fertility. A bill introduced in the Ohio Senate would have required mothers of drug-addicted newborns to undergo tubal ligation or drug addiction treatment.

•**Teenage pregnancy** was the subject of 35 bills introduced in 1990, although just four were approved. A majority of the bills that were considered dealt with support services for already-pregnant adolescents and for teenage parents; most did not address pregnancy prevention strategies. Louisiana enacted the most comprehensive measure, one that included a pregnancy prevention component along with counseling programs on prenatal care and

adoption. Alaska's legislature set up a task force on adolescent pregnancy to gather data and recommend a statewide plan; New York's approved a bill to extend for four years the Adolescent Pregnancy Prevention and Services Act of 1984. In California, a new measure required the state education superintendent to report to the legislature on the need to coordinate all state programs serving pregnant and parenting teenagers. Two other California bills—one to educate teenage males on the responsibilities and risks of early fatherhood and another to fund three pilot projects for preventing second pregnancies among teenage mothers—were vetoed.

Maternal and Child Health Issues

Increasing concern over the high incidence of infant mortality and the lack of access to prenatal care among low-income women did not stir legislatures to enact innovative programs or to appropriate more funds to deal with these problems. Although 346 bills concerning prenatal and infant care, medical insurance for pregnancy, parental leave, midwifery services and perinatal alcohol or drug use were introduced during 1990, few new laws were passed.

•**Insurance and Medicaid coverage** did not receive as much attention in 1990 as it had the year before, since the U.S. Congress had mandated that by April 1990, all states were to raise the income cutoff for Medicaid coverage for pregnant women and women with infants under age one from 100 percent to 133 percent of the federal poverty level. (Coverage up to 185 percent of the poverty level was optional.) By the end of 1989, many legislatures had already expanded to 133 percent, while some had exercised the option to expand to 185 percent. In addition, a near unanimous vote of governors in 1990 resulted in a request for a two-year moratorium on further federal expansions because of fiscal problems in implementing these at the state level.

Even though 62 bills concerning insurance coverage for pregnant women were introduced, only four dealing with Medicaid expansion were enacted and none included an expansion to 185 percent of the federal poverty level. In Arizona and Colorado, the legislatures approved an expansion to 133 percent, and Arizona also approved additional coverage for children under age eight in families with incomes up to 100 percent. In Illinois, the governor signed legislation that not only meets the 133 percent mandate, but also covers chil-

*The governor's veto was overridden by the Mississippi legislature in January 1991.

dren up to age six instead of up to age one. In New Mexico, the legislature adopted a resolution calling for an examination of the possibility of expanding its coverage.

•*Family and medical leave* legislation was vetoed over the summer of 1990 by President George Bush. Although some state legislatures may have delayed taking action on their own leave bills while the federal bill was pending, four of 76 bills introduced were enacted, in Maine, Minnesota, Rhode Island and Vermont. Three of these amended existing law: The Rhode Island measure offered 18 weeks of unpaid leave to employees of companies with 25 or more workers; the Minnesota law deleted a requirement that workers be employed for at least 12 months before being eligible for leave, and added a guarantee that employees can return to their former positions when their leave expires; in Vermont, parental-leave policies were extended to cover state employees. The Maine legislature extended for another year the life of a legislative committee studying revisions to current family medical-leave provisions.

•*Perinatal drug and alcohol exposure* was the focus of much concern at the start of 1990, because of fears that measures in this area might prove to be more punitive than helpful. However, of 82 measures pertaining to the abuse of potentially harmful substances during pregnancy, only six bills and four resolutions were approved, none of them punitive. The Alaska legislature passed two laws concerning the provision of warnings and other printed information about the hazards of alcohol consumption during pregnancy. California required the state health and welfare agency to develop and disseminate a model needs-assessment protocol for substance abusing pregnant and postpartum women; another California law provided for services to low-income pregnant women addicted to alcohol or drugs and to women who have given birth to a drug-exposed infant.

•*Other areas* of legislative action concerned access to delivery and postpartum services. Of 24 bills concerning midwifery services that were introduced in 1990, five passed—in Arizona, Connecticut, Hawaii and Maryland (two separate measures, one of them vetoed later). The new laws established regulations on midwifery licenses and on prescribing medications in specified circumstances. A measure enacted in Colorado enabled birth centers to receive some state funding; a new law in Indiana established a program registering maternity homes and providing a tax credit for owners of such homes; an Illinois bill required the department of public health to

set minimum standards for at-home health-care visits for new mothers and infants; and a California measure required the health department to administer a statewide program of prenatal testing for genetic disorders and birth defects.

STDs and AIDS

Significantly fewer bills related to STDs and AIDS were introduced in 1990 (a total of 531) than in earlier years; half of these were carried over from 1989, and only 44 were signed into law. Although the numbers of cases of many STDs are on the rise, the AIDS epidemic has consumed most of the legislators' time and effort. Among the bills approved were two comprehensive statutes and 17 bills on testing or reporting, nine concerning treatment, seven about education or prevention, six related to discrimination and two on research.

In 1990, legislators seem to have focused more than in the past on treatment and on addressing discrimination and less on punishing people who spread disease. Of all measures proposed, 25 carried criminal penalties for exposing others to AIDS, but none was approved. As in previous years, a majority of measures on STDs or AIDS (280 bills) that were introduced pertained to testing, counseling and reporting; overall, however, the number of bills calling for mandatory testing decreased, while the number concerned with counseling and confidentiality increased slightly.

•*Education and prevention* measures were enacted in Alabama, California, Hawaii, Kentucky, Michigan and Wisconsin in 1990. Four of these new laws specifically dealt with requiring or improving AIDS education curricula in the public schools; at last count, more states mandated AIDS education than required sexuality education. In Kentucky, the governor approved a comprehensive bill establishing a statewide public education program about AIDS, besides requiring an AIDS component in the family life education course for grades 10–12. A controversial prevention bill in Hawaii established a program to induce intravenous drug users to exchange used needles and syringes for sterile ones, to encourage them to seek rehabilitation and to offer them AIDS information.

•*Discrimination against and treatment of HIV-positive individuals* were the focus of 15 new laws. The Arizona and Wisconsin legislatures passed bills prohibiting insurance carriers from discriminating against individuals with AIDS, and the governor of Colorado signed a bill establishing a pilot insurance assistance program for AIDS patients. In Nebraska, an all-encom-

passing ban on discrimination against individuals with AIDS was enacted, along with the authority to bring civil actions for violations. A new Tennessee law broadened the definition of "handicapped" to include persons with infectious diseases. A new law in Indiana provided extra services to infants born with AIDS (similar to those provided to infants born with fetal alcohol syndrome, drug addiction or birth defects). In Idaho, AIDS and HIV infection were added to the list of occupational diseases covered by workers' compensation insurance for occupations involving exposure to human blood or body fluids.

Infertility-Related Issues

Although state legislators have tried in the past to deal with some of the newer issues involving nontraditional parenthood, the reproductive technologies developed in the last 10 years have advanced so quickly that legislators have hardly been able to keep pace by passing laws and regulations governing their availability and use. Insurance coverage of infertility diagnosis and treatment and the regulation of the new technologies and of surrogacy contracts concerned many legislators in 1990.

•*Insurance coverage* of infertility care was the subject of 22 bills. However, just one, from New York, was enacted during 1990. This law required every type of health insurance policy to include coverage for hospital, surgical and medical care for the diagnosis and treatment of infertility, if it provides the same level of coverage for other health problems. In the last few years, 10 measures regarding infertility insurance coverage have been enacted, with six requiring employers to buy policies that include infertility coverage.

•*Surrogacy* has become more common as an option for infertile couples since the mid-1980s; as a result, hundreds of bills to regulate or prohibit the making of such contracts have been introduced. In states where no policy or case law on surrogacy contracts has been established, legislators remain in a quandary over their legitimacy. Clearly, the practice is controversial: Over two-thirds of the 70 infertility-related bills introduced in 1990 concerned surrogate parenthood. Three such bills were enacted (in California, Michigan and New Hampshire). The New Hampshire law allows surrogacy contracts to be made and establishes standards and safeguards to protect all parties. The Michigan legislation defines key terms used in surrogacy contracts, in order to clarify a previous bill that limited their availability.

(Continued on page 94)

DIGEST

Weekly Testosterone Injections Suppress Sperm Production, May Provide Effective Contraception

Weekly injections of testosterone enanthate completely suppressed sperm production in a large group of fertile men, and provided contraceptive efficacy at a rate comparable to that of female injectable contraceptives and better than that of the IUD, the pill or the condom.¹ A 10-center study conducted by the World Health Organization (WHO) also showed that recovery from sperm suppression was easily achieved, and that side effects from the injections were minimal. However, discontinuation rates were high, and were related mostly to the treatment's inability to completely suppress sperm production.

The WHO study subjects were 271 healthy, fertile men between ages 21 and 45, recruited from 10 study centers around the world.* To be eligible for the study, subjects had to be in stable relationships with healthy partners no older than 35 years old and to have normal sperm with a count of more than 20 million per milliliter. The mean age among study participants was 29 years; 228 (84 percent) of the men had established fertility with their partners, for a median of two completed pregnancies per participant.

The study was divided into three phases—suppression, efficacy and recovery. Throughout the study, subjects were given weekly 200 mg injections of testosterone enanthate. Semen samples were collected once a month for the first two months, and then once every two weeks during the remainder of the suppression phase. Two months into the suppression phase, any couple using a hormonal method was required to switch to a barrier method. This phase ended when the man stopped producing sperm—in other words, became azoospermic—at which

point he and his partner ceased all other contraceptive use. The efficacy phase then began, and continued until an individual subject stopped receiving injections (which could be up to a year after the first injection). At that point, the subject entered the recovery phase, during which he was monitored for his return to normal spermatogenesis.

Fifty-eight percent of the men participating in the study (157 in all) ceased sperm production during the suppression phase; their mean time from the first injection to azoospermia was 120 days. Seventy-five percent of these men (119) completed the efficacy phase. Thus, 114 men (42 percent) left the study during the suppression phase and 38 (14 percent) left during the efficacy phase. More than half of those who left during the suppression phase did so because they did not achieve sufficient sperm suppression; this was a 23 percent life-table discontinuation rate within six months of beginning injections. However, the six-month life-table rate for becoming azoospermic was almost 65 percent; 70 percent of those who completed the suppression phase were able to completely cease sperm production. There were no variations in age, height, weight or other baseline characteristics between those who successfully completed suppression and those who did not. There was some variation between centers, however: The Chinese centers had a mean azoospermia rate of 91 percent, compared with 60 percent in the other centers.

After the injections began, subjects who became azoospermic as well as those who did not experienced a four percent increase in mean body weight, a six percent increase in mean hemoglobin level and a 142 percent increase in mean testosterone level. Among all subjects there was also a six percent decrease in mean testicular volume, an eight percent decrease in mean plasma urea level, a decrease in mean

luteinizing hormone level of 67 percent, and a decrease in follicle-stimulating hormone level of eight percent. All of these values returned to normal baseline levels during the recovery phase.

Eight men stopped receiving injections during the suppression phase because their partners became pregnant. (Participants had agreed to use other forms of contraception during this phase, but it is not known how well they complied with this regulation.) One pregnancy occurred during the 1,486 months of the efficacy phase, a pregnancy rate of 0.8 per 100 person-years. Overall, sperm were found in only 21 of 1,515 semen samples taken during the efficacy phase; of these 11 men, none discontinued the study, nor did any of their partners become pregnant.

Two men were released from the study during the efficacy phase because they did not satisfy the original admission criteria, and 15 men (an annual cumulative life-table discontinuation rate of about eight percent) left during the suppression and efficacy phases because of the following difficulties with the injections: Dosages were too frequent (five subjects), were too painful (six subjects), caused infection at the injection site (one subject) or were not given within the prescribed time interval (three subjects). A total of 52 men left during the suppression and efficacy stages for medical or personal reasons (annual rates of 12 percent and 13 percent, respectively): Nine reported acne; three reported increased aggressiveness or libido; two each left because of raised packed cell volume and hemoglobin, weight gain, and abnormal lipids; and one each because of hypertension, depression, fatigue, aphthosis, acute prostatitis, pneumonia, and Gilbert's syndrome. Three left the study because of their partners' medical problems.

At the time of the study report, recovery information was available for 230 subjects (85 percent of the original sample). In 192

*Men enrolled in the study were from one center each in France, Finland, the United States, Scotland and Sweden, from two centers in Australia and from three centers in China.

men (84 percent), sperm concentration had surpassed the study baseline of 20 million per ml, and in 106 (46 percent) it had returned to their own baseline level. The median time needed to return to 20 million per ml was 3.7 months among those who had reached azoospermia, 3.0 months among those who had not and 3.9 months among those who had discontinued the study for other reasons. The participants needed somewhat longer to return to their own baseline sperm concentration—6.7 months, 5.7 months and 9.0 months, respectively. During the recovery period, there were 11 conceptions, of which two resulted in induced abortion, one in spontaneous abortion, four in normal live births and the remainder in continuing pregnancies. Two men left so that their partners

could conceive; the women became pregnant during the recovery phase.

The failure rate of the testosterone injections in this study was comparable with the first-year failure rates of women's injectable contraceptives (0.2–0.4 per 100 person-years of protection), and better than that of oral contraceptives (three per 100 person-years) and IUDs (six per 100 person-years).² Furthermore, the efficacy rate is significantly better than that of the condom (12 per 100 person-years of protection), the only other reversible male contraceptive.

The investigators emphasize that the aim of the study was to determine if the laboratory diagnosis of azoospermia corresponded to high contraceptive efficacy, not to promote testosterone enanthate as a

hormonal method. Apart from its inability to induce complete azoospermia in many men, the frequency of the injections would be inconvenient for the general population, and would create difficulties in dispensing the method. However, the researchers point out that the WHO and other groups have been investigating longer-acting testosterone formulations that might allow for 3–4 month intervals between injections.—R. Turner

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Strenuous Work During Medical Residency Does Not Increase Risk of Adverse Pregnancy Outcomes

Working long hours during pregnancy in a stressful occupation carries no elevated risk of adverse birth outcome, at least among women of high socioeconomic status.¹ There was virtually no difference in the rates of preterm delivery or in the proportion of infants who were small for gestational age among female medical residents who worked long hours far into their pregnancies and among similar pregnant women—their male classmates' wives. Although the pregnant residents were significantly more likely to go into preterm labor and to be diagnosed with preeclampsia, these complications did not affect the birth outcomes.

The researchers used the Physicians' Master File of the American Medical Association to recruit a large, nationally representative sample of doctors who graduated from medical school in 1985. Survey questionnaires were mailed to the 5,079 women graduates who started their residencies and to 4,968 randomly selected male residents from the same graduating class. The overall response rate was 86 percent, although slightly more female than male residents returned the questionnaire (87 percent vs. 85 percent). (Nonrespondents were contacted by postcard, and were then called and interviewed over the telephone if they still did not reply by mail.) The survey items included the pregnant woman's social and physical characteristics, the type and amount of work she did during pregnancy, the attitudes of the woman's colleagues toward her pregnancy and the outcome of her pregnancy. Wives who were either medical students or resi-

dents themselves were excluded from the analysis.

The survey revealed that 1,293 female physicians and 1,494 spouses of male physicians became pregnant during residency. Female physicians were nearly three times as likely as their classmates' wives to have terminated the pregnancy (eight percent vs. three percent).

There were no statistically significant differences between the residents and their colleagues' wives in the proportion of pregnancies that ended in miscarriage (14 percent vs. 12 percent) or stillbirth (0.2 percent vs. 0.5 percent). Overall, 989 residents and 1,239 spouses gave birth to live-born singleton infants. Compared with the spouses of colleagues, the residents were significantly older, more likely to be black and more likely to be giving birth for the first time ($p < .001$). Three-quarters of the wives were employed in a wide variety of occupations: The group included nurses (23 percent), teachers (11 percent), secretaries (five percent) and accountants (three percent). Few women in the study smoked. While there were no significant differences in weight gain during pregnancy, residents weighed slightly more before pregnancy than did their classmates' wives (59 kg vs. 56 kg).

In each trimester, women residents worked almost twice as many hours weekly as the employed wives of their male colleagues, a statistically significant difference ($p < .001$). In the first trimester, for example, residents worked 74 hours per week, while their colleagues' spouses worked 38 hours. The spouses stopped

working an average of 35 days before delivery, but the residents, on average, worked up until 12 days before giving birth. In fact, the residents were twice as likely as the wives to have worked until either the day before delivery or the day of delivery itself (52 percent vs. 26 percent). Moreover, compared with the wives, the residents received significantly less encouragement and support from their co-workers and supervisors throughout their pregnancies.

However, despite having worked much longer hours, residents were no more likely than the wives of their colleagues to have had a preterm delivery (less than 37 weeks' gestation) or to have had an infant who was small for gestational age (weight under the 10th percentile for gestational age). Furthermore, even after the investigators adjusted for factors known to affect such negative birth outcomes (age, race or ethnicity, height and prepregnancy weight), they found no statistical or clinical differences between the two groups of women. Nonetheless, residents were roughly twice as likely as their classmates' spouses to have experienced premature labor (requiring bed rest or hospitalization) or preeclampsia ($p < .001$).

To determine how the number of hours or nights worked might have affected birth outcomes, the researchers compared residents who had worked more than 100 hours per week with those who had worked fewer hours. Working up to 100 hours per week during pregnancy was not associated with preterm delivery. However, working more than 100 hours in the

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first trimester increased this risk significantly ($p=.012$) and the risk of preterm delivery also increased in the second trimester, although not significantly ($p=.07$). Once the 53 residents who had stopped work by the third trimester were excluded, residents who worked over 100 hours in the third trimester were significantly more likely to have delivered early than were those who had worked fewer hours (10 percent vs. five percent, $p=.04$). However, there was no similar effect on the risk of

having an infant who was small for gestational age. The average number of nights per month on call had no effect on either adverse pregnancy outcome. Even surgeons and obstetrician-gynecologists—who worked the longest hours and spent the most time on their feet—were not significantly more likely than other residents to have had a low-birth-weight baby, a preterm delivery or an infant who was small for gestational age.

According to the researchers, although the significantly higher rates of preeclampsia and preterm labor among residents could represent true increased risks, these rates might also have been influenced by more vigilant diagnosis and by the tendency among physicians to report their

own symptoms. Pregnant residents who work long weeks of more than 100 hours may have an increased risk of preterm delivery. Otherwise, the results indicate no increased risk of adverse pregnancy outcomes among these women of high socioeconomic status who have exceptionally stressful and physically demanding jobs. Thus, the purported link between work-related stress and adverse pregnancy outcome possibly stems from unmeasured socioeconomic factors rather than from the effects of work itself.—L. Remez

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Rates of Adolescent Pregnancy and Childbearing Are High Among Mexico-born Mexican Americans

Although Mexican American adolescents born in Mexico are less likely to begin sexual activity at a young age than non-Hispanic whites or U.S.-born Mexican Americans, they have the highest rates of early pregnancy and childbearing. According to a survey of Mexican American and non-Hispanic adolescent women in Los Angeles County,¹ non-Hispanic whites have the highest rates of early sexual activity and abortion, but Mexico-born adolescents have the highest rates of early childbearing because they are the most likely to become pregnant once sexually active and the least likely to terminate a pregnancy. U.S.-born Mexican Americans have the highest rates of nonmarital childbearing, while Mexico-born adolescents are the most likely to have an early marital birth.

Households from a community-based probability sample of Mexican Americans and non-Hispanic whites living in Los Angeles County were selected for inclusion in a prospective survey that compared the timing of first intercourse, pregnancy and birth among adolescents. Female residents aged 13–19 who identified themselves as Mexican American (either U.S.-born or Mexico-born) or non-Hispanic white were considered eligible; only one respondent per household was interviewed. Among the original sample of 1,023 adolescents, 31 percent were non-Hispanic whites, 39 percent were U.S.-born Mexican Americans and 30 percent were Mexico-born Mexican Americans. Participants were intended to be interviewed twice—once between January 1984 and May 1985 and again between January 1986 and May 1987. Twenty-five percent of those initially sampled could

not be reached for follow-up; the inability to locate respondents who had moved accounted for the bulk of the attrition between interviews. Disproportionately more Mexico-born adolescents and those with sexual experience—and, specifically, a prior pregnancy—were lost to follow-up.

Compared with either group of Mexican Americans, non-Hispanic white adolescents were most likely to have had sexual intercourse both at the initial interview and at the follow-up two years later (Table 1). Mexican Americans born in Mexico, on the other hand, were consistently least likely to have had sexual intercourse. Moreover, the non-Hispanic adolescents were most likely to have had more than

one partner, even when the number of years of sexual activity was controlled for (not shown): Seventy percent of non-Hispanic whites said they had had more than one sexual partner, compared with 51 percent among Mexican Americans born in the United States and 20 percent among those born in Mexico.

Within each group, the proportion who were ever pregnant doubled between the two interviews. Although Mexican Americans born in the United States were slightly more likely than those born in Mexico to have been pregnant at the first interview (12 percent vs. 11 percent), Mexico-born adolescents were more likely to have experienced a pregnancy by the time of the second interview (29 percent vs. 26 percent). Non-Hispanic whites, in contrast, were least likely to have had a pregnancy at either interview (nine percent and 20 percent, respectively).

Similar patterns are apparent in the proportions who ever had a live birth, with Mexico-born adolescents having the highest rates of childbearing, non-Hispanics the lowest, and U.S.-born Mexican Americans occupying the intermediate position. Non-Hispanic whites were far more likely than either Mexican American group to have had an abortion: Thirteen percent of non-Hispanic whites had had an abortion by the second interview, compared with 2–3 percent among Mexican Americans.

The differences in the three groups are most pronounced at the second interview and they are accentuated when the analysis is restricted to those who have had sexual intercourse or who have ever been pregnant (not shown). For example, among

Table 1. Age-adjusted percentage of adolescent women in Los Angeles County who have experienced sexual intercourse, a pregnancy, a live birth or an abortion, by ethnicity, according to interview

Fertility-related variable and interview	Non-Hispanic white	Mexican American	
		U.S.-born	Mexico-born
Sexual intercourse			
Interview 1	34.3	27.8	16.4
Interview 2	61.8	56.5	39.2
Pregnancy			
Interview 1	8.8	12.1	10.6
Interview 2	20.4	26.0	29.1
Live birth			
Interview 1	3.3	7.0	8.2
Interview 2	9.0	18.5	23.8
Abortion			
Interview 1	4.8	2.5	0.5
Interview 2	12.5	3.1	1.5

those who initiated sexual activity by the second interview, 74 percent of Mexico-born adolescents had ever been pregnant, compared with 46 percent of U.S.-born Mexican Americans and just 33 percent of non-Hispanic whites. Restricting abortion experience to those who have ever been pregnant reveals even broader differences by ethnicity and country of birth: At the second interview, 61 percent of non-Hispanic whites had had an abortion, compared with 12 percent of U.S.-born Mexican Americans and just five percent of their Mexico-born counterparts. Consequently, among those who had ever been pregnant, 82 percent of adolescents born in Mexico had had a live birth, compared with 72 percent of U.S.-born Mexican Americans and only 44 percent of non-Hispanic whites.

The researchers used survival analysis techniques to assess the cumulative proportions of adolescents who had not experienced a particular event by a specific age. For example, the cumulative proportion who had not initiated sexual intercourse by age 15 was markedly higher among Mexico-born adolescents (.894) than among U.S.-born Mexican Americans (.802) or among non-Hispanic whites (.767); by age 19, the cumulative proportion of Mexico-born adolescents who had never had intercourse (.465) was more than double that among non-Hispanic whites (.224) and nearly twice that among U.S.-born Mexican Americans (.249). The probability of initiating sexual intercourse increased sharply between ages 15 and 17 among non-Hispanics and U.S.-born Mexican Americans, while the peak ages for the initiation of sexual relations among Mexico-born adolescents were 17-19. Although age-related patterns of the occurrence of a first pregnancy were fairly similar, the cumulative proportion who had not yet given birth at each age varied markedly by ethnicity and country of origin. For example, the proportion who had not had a live birth was similar among the three groups up to age 17, but declined rapidly thereafter only among Mexican-American adolescents.

The authors surmise that differences in marriage patterns probably contribute to these variations in early first birth. Mexico-born adolescents were more likely than U.S.-born Mexican Americans or non-Hispanics to have ever been married (14 percent vs. seven percent and five percent, respectively). Moreover, Mexico-born adolescents were the least likely to have experienced their first sexual intercourse, pregnancy or birth while unmarried. The ten-

dency of Mexico-born adolescents to marry early explains much of the difference in fertility between this group and non-Hispanic whites. In addition, compared with the other two groups, Mexican Americans born in the United States were the most likely to have an early first birth outside of marriage.

Thus, non-Hispanic whites are more likely to engage in early sexual activity than are Mexico-born adolescents, but because the former are much less likely to become pregnant—and more likely to have an abortion if they do—Mexico-born teenagers are much more likely to give birth as adolescents. The researchers point out that many of the adolescents surveyed (especially non-Hispanics) are at risk of infection with the human immunodeficiency virus and other sexually transmitted diseases. Further, the researchers argue that the focus of interventions to reduce adolescent pregnancy should shift over time: Since sexual activity increases with age, primary prevention programs should focus on delaying the onset of sexual activity among younger teenagers but should move toward preventing births through contraceptive use among older teenagers. They recommend that family planning programs address contraceptive needs both before and during marriage, since many adolescents are unprepared for reproductive decisions when married. Finally, given the differences by ethnicity and background in the use of abortion, the researchers conclude that any restriction in teenagers' access to abortion "is likely to increase births sharply among young non-Hispanic whites, but to have comparatively little impact among young Mexican Americans."—L. Remez

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Contraceptive Use High, Pill and Barrier Methods Widely Used in Denmark

Levels of contraceptive knowledge and use are very high among Danish women.¹ According to a 1988 survey conducted by the International Health Foundation, nine out of 10 women in Denmark aged 15-44 who are at risk of pregnancy are practicing some form of contraception. The most popular contraceptive method is the pill, used by 36 percent of these women; however, many of those surveyed—including

10 percent of pill users—use the condom in conjunction with another method. Thirteen percent of women say they plan to change their current contraceptive method, one-third of them because of safety concerns, including fear of side effects and concern over AIDS and sexually transmitted diseases.

A total of 1,033 Danish women aged 15-44 were interviewed in their homes for the survey. Forty-four percent were married, 24 percent were living with a partner of the opposite sex, 27 were single and not cohabiting and five percent were divorced. Fifty-seven percent were employed, 28 percent were students and 15 percent were housewives or were unemployed. Thirty-six percent had had a higher education, 39 percent had had a secondary education and 25 percent had had only a partial or full elementary school education. Fifty-four percent had had at least one child. The majority said they were postponing their next birth (44 percent) or wanted no more children (38 percent). Twenty-one percent had had an unplanned pregnancy; eight percent had had more than one.

Overall, 92 percent of the women exposed to the risk of unwanted pregnancy* were currently using a method of contraception (Table 1, page 90). Contraceptive use was highest among women aged 25-29 (96 percent), and lowest among those aged 15-19 (85 percent). Use did not differ by fertility intention: Women who wanted to space births and those who had completed their families were equally likely to be using a method (approximately 92 percent of both groups). However, use was higher among those with two or more children (95-96 percent) than among those with one child (80 percent) or none (90 percent). Use was also higher among women with a high school education or more (93-94 percent) than among those with only an elementary education (86 percent).

The pill and barrier methods were the most popular contraceptive methods among Danish women—36 percent and 25 percent, respectively, of those exposed to the risk of pregnancy used them. The IUD and sterilization were used by 14 percent each of this group; eight percent used no method, while four percent relied on rhythm or withdrawal. However, many women said they used the condom in conjunction with other methods: Of the 249 women who said they used the condom, 93 (38 percent) said they used it in addi-

*Defined as sexually active, fertile and interested either in postponing pregnancy or in ending childbearing.

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tion to another method, including 50 percent of those who used rhythm and withdrawal, 10 percent of pill users, two percent of IUD users, half the diaphragm users, and even 2-6 percent of those who were sterilized.

Pill use declined with age, starting out at 64 percent among 15-19-year-olds, reaching a high of 71 percent among 20-24-year-olds and falling to a low of 12 percent among 40-44-year-olds. The gap appeared to be filled by sterilization, the IUD and barrier methods. The proportion of couples protected by sterilization rose from a low of four percent among those 25-29 years old to a high of 33 percent among those 40-44 years old. Use of barrier methods reached a peak of 37 percent among 25-29-year-olds, but always remained above 19 percent. Use of the IUD was highest among 30-34-year-olds (30 percent) and 35-39-year-olds (21 percent).

The most popular method among women attempting to postpone their next birth was the pill (49 percent), followed by barrier methods (27 percent), the IUD (12 percent) and rhythm or withdrawal. In contrast, among women who had completed their family, 29 percent relied on sterilization, 22 percent on barrier methods, 19 percent on the pill, and 18 percent on the IUD.

Women with the highest levels of education were most likely to use the pill: Forty-four percent of those with more than a secondary education used this method, compared with 35 percent of those with a completed secondary-education and 26 percent of those with a completed elementary education. By contrast, sterilization was used by 26 percent of those with the

least education but by only four percent of those with the most education. Barrier method use was fairly constant among all three educational groups.

Methods were most often chosen because of their reliability (47 percent), followed by their ease of use (40 percent) and their safety (33 percent). The main reasons women chose barrier methods were concerns about AIDS; fear of heart, breast, thrombotic and embolic diseases; and infrequent intercourse. The main reasons for choosing the pill were reliability, an improved sex life and ease of use. The chief reason for choosing the IUD was ease of use, while sterilization was valued for its reliability.

Although 80 percent of the women surveyed said they were satisfied with their current method, another 13 percent had decided to switch methods in the coming year. Twenty-five percent of these women were seeking greater reliability, an additional 17 percent feared serious disease with their present method, eight percent had experienced side effects with their present method, and nine percent were concerned about preventing AIDS and STDs; thus, safety considerations accounted for 34 percent of those who intended to change methods.

The main source of advice on contraception for Danish women was their general practitioner (38 percent), their parents or relatives (19 percent), their friends (18 percent) and their gynecologist (11 percent). However, when asked what source of information most influenced their choice of method, 27 percent of the women said it was their doctor, while 26 percent said it was their own reading. Smaller percentages cited school (13 percent), friends (12 percent), parents (11 percent), their partner (seven percent), radio or television (three percent) and family planning clinics (one percent).

Eighty percent of the women sampled

had used the pill at some time; 64 percent of all the women interviewed knew how it worked. Of the whole sample, 51 percent thought that not even one pill could be missed without loss of effectiveness, but 16 percent thought that 1-3 pills could be missed without risk. The mean length of pill use was 4.8 years among past users and 5.6 years among current users. Those who had discontinued pill use did so most often because of side effects or other health reasons (60 percent); the remaining 40 percent had done so because they wished to conceive.

When asked about likely negative aspects of pill use, 59 percent cited the risk of cancer, 46 percent cited possible infertility and 44 percent heart disease; reversible side effects such as weight gain, nervousness and depression were mentioned by 86 percent, 57 percent and 55 percent, respectively. However, many also recognized the positive aspects of pill use, with 95 percent alluding to its ease of use and to the fact that it regulates the menstrual cycle.

Twelve percent of the sample was currently using the IUD, 18 percent had used it in the past and 70 percent had never used it. Past users had stayed with the device for an average of nearly four years. More than half had it removed because of health reasons and 23 percent because they wished to conceive. Current users had relied on the device for an average of nearly seven years. Overall opinions of the IUD were negative: Eighty-five percent believed it caused infection, 77 percent believed it was often expelled, and 75 percent believed it caused heavy bleeding, although over half said it was safe for health and good for childspacing.

The investigators speculate that unwanted pregnancies among Danish women are most likely caused by misunderstanding the use of a new method when there is a change of method; simple method failure; or "eschewal of the use of any method at all because of a fear of side effects." Although communication about contraception and fertility in Denmark appears to be widespread, the researchers call for further efforts to educate the public, including "a greater commitment on the part of the media, particularly as regards the avoidance of publication of sensational and unfounded reports about alleged harmful effects of the pill and the IUD."—R. Turner

Reference

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Table 1. Percentage of currently married Danish women aged 15-44 exposed to the risk of unintended pregnancy, by contraceptive use status and method used, according to age

Method	Total	Age					
		15-19	20-24	25-29	30-34	35-39	40-44
Currently using	92	85	94	96	93	90	91
Pill	36	64	71	37	25	13	12
Sterilization	14	0	0	4	13	26	33
IUD	14	2	2	14	30	21	16
Barrier	25	19	19	37	23	27	22
Rhythm	<1	<1	<1	1	<1	1	1
Withdrawal	3	0	2	3	2	2	7
Not currently using	8	15	6	4	7	10	9
Total	100	100	100	100	100	100	100

Expansion of Medicaid Alone May Not Result In Healthier Newborns

Medicaid coverage alone is not enough to ensure adequate prenatal care and improve pregnancy outcomes, according to a recent study examining pregnancy outcomes in Tennessee before and after extension of Medicaid eligibility to pregnant, low-income married women.¹ Although the proportion of mothers enrolled in Medicaid at the time they delivered was significantly larger after the expansion of eligibility, there were no significant improvements in early use of prenatal care, rates of low birth weight or neonatal mortality.

Medicaid was originally designed to cover recipients of cash assistance from the Aid to Families with Dependent Children (AFDC) and Supplemental Security Income programs; therefore, pregnant low-income women who were married or expecting their first child were not eligible. In recent years, however, because of concern about the high level of infant mortality in the United States, Congress has mandated the expansion of Medicaid eligibility to provide broader coverage to pregnant women and their infants.

In Tennessee, Medicaid coverage for the medically needy (persons meeting income-eligibility criteria after health care expenditures are deducted from income) was extended on July 1, 1985, to include low-income married women during pregnancy. This study examined the effects of that change in regulations on early use of prenatal care and on rates of low birth weight and neonatal mortality. It included all live singleton births of infants weighing 500–6,000 g to black women and white women residing and delivering in Tennessee. A total of 62,946 births in the 12 months before the change in regulations (July 1, 1984–June 30, 1985) met the study criteria. Outcomes for those births were compared with outcomes for 63,493 eligible births that occurred during the second year after the change in regulations (July 1, 1986–June 30, 1987). Births during the transition period (July 1, 1985–June 30, 1986) were not included in the analysis.

To identify the groups most affected by the change in regulations, the investigators stratified the mothers by race, marital status, educational level, age-group and parity. The proportion of women who were enrolled in Medicaid at the time they delivered increased from 22 percent in the year before the change to 29 percent in the year after the transition period. Medicaid

enrollment rose in all maternal groups, with the largest increase occurring among married mothers younger than 25 who had less than 12 years of education. In this group, enrollment rose from 24 percent to 42 percent among whites and from 32 percent to 53 percent among blacks.

Despite the increase in Medicaid enrollment between the two study periods, there was a significant increase ($p < .05$) in the proportion of women who did not receive prenatal care during the first trimester, and there was no improvement in the rates of very low birth weight (less than 1,500 g), moderately low birth weight (1,500–2,499 g) or neonatal mortality. In each period, the group of mothers least likely to obtain early prenatal care and most likely to have adverse pregnancy outcomes—that is, the group of unmarried black women younger than 25 with less than 12 years of education—had a high rate of Medicaid enrollment: 75 percent in the first period and 79 percent in the second. The proportion of these women who received no prenatal care during the first trimester was similar in the two study periods (54 percent and 53 percent, respectively); likewise, there was little change in the rates of very low birth weight (21 cases per 1,000 live births vs. 22 per 1,000) or moderately low birth weight (120 per 1,000 vs. 115 per 1,000), and the neonatal mortality rate was 9.7 deaths per 1,000 births in both periods.

The group with the largest increase in enrollment—married white women younger than 25 with less than 12 years of education—showed no significant improvement in early use of prenatal care or in any of the adverse pregnancy outcomes. Because any effects of the regulation change should have been most apparent among these women, the investigators conducted further analyses to try to determine the reasons for the lack of improvement. The only difference in group characteristics between the two periods was that a significantly greater proportion of the births were third order or higher ($p < .01$) during the year following the transition period than in the year preceding the transition. In addition, the proportion of these women who enrolled in Medicaid during the 30 days prior to delivery more than doubled, from 12 percent during the year before the regulation change to 29 percent during the year after the transition period ($p < .001$). In both periods, more than two-thirds of those who enrolled did so after the first trimester.

Because they lacked information on the women's income, assets and other medical

expenses, the investigators could not identify those who became eligible for Medicaid coverage as a result of the regulation change. They note, however, that the higher enrollment among married women after the transition period was not accompanied by a similar increase among unmarried women, suggesting that the growth in enrollment in the former group resulted from the change in regulations. In addition, they caution that the interval between the beginning of pregnancy and the date of Medicaid enrollment may have been underestimated because of the practice of setting the enrollment date back to cover previously incurred expenses. This practice is most likely to have affected enrollment data for the third trimester: Some women recorded as enrolling during the 30 days before delivery may actually have enrolled when they entered the hospital to give birth.

The investigators point out that factors inherent in the Medicaid enrollment process may have discouraged early use of prenatal care. Because Medicaid eligibility is based on family income after medical expenditures, some women without preexisting medical conditions would not have become eligible until late in pregnancy, after they had incurred the necessary amount in pregnancy-related expenses. After a woman meets the eligibility criteria, processing the application delays her coverage still longer. In addition, many providers do not accept Medicaid patients: A 1985 survey of fellows of the American College of Obstetrics and Gynecology found that only 63 percent of those practicing obstetrics provided care to Medicaid patients. The investigators conclude that "progress in reducing the high rates of unfavorable perinatal outcomes in the United States may require both changes in Medicaid and the development of programs that address the nonfinancial barriers to prenatal care."

An accompanying editorial points out that before the expansion of coverage, Medicaid recipients were already the group at highest risk of adverse pregnancy outcomes.² Noting that "the high rates of low birth weight and infant mortality in this group reflected their adverse demographic characteristics," the editorial concludes that Medicaid coverage is "not sufficient to ensure better prenatal care and birth outcomes. . . . because it does not ensure the scope of services, content of care, and organization of services necessary to address the needs of women with low incomes. The outcome of care under Medicaid coverage is limited by the char-

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acteristics of the obstetric system from which these women can purchase services with their Medicaid cards."—F. Althaus

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Adolescents Are More Likely to Use Condom Than Pill at First Coitus

One-third of black teenage women and one-half of white teenage women surveyed in 1982 had used a contraceptive at first intercourse; among those who had not, the likelihood that they had begun use in the year following first intercourse dropped steeply. Among white teenage women who had used a contraceptive at first intercourse, those whose mothers were relatively highly educated were more likely to have used condoms, but were less likely to have used the pill. Urban black teenage women were less likely to have used condoms at first intercourse and were more likely to have used no method at first intercourse than were rural black teenagers.¹

To examine the relationship between first intercourse and first contraceptive use among teenagers, researchers analyzed a subgroup of 1,833 women from the 1982 National Survey of Family Growth. The women studied were aged 15–24 in 1982 and had had premarital sex in their teens. A polytomous logit analysis of method choice at first intercourse provided the odds that women with selected demographic or socioeconomic characteristics would choose certain methods* over others. Whites and blacks were analyzed separately.

The investigators examined the predicted proportions of women with various

characteristics who chose each type of method at first intercourse, controlling for the effects of family background characteristics.† Overall, two-thirds of black adolescents and almost one-half of whites had not used a method at first intercourse. Black teenagers were about as likely to have used the condom (14 percent) as the pill (13 percent). In contrast, white teenagers were less likely to have used the pill (11 percent) than either the condom (22 percent) or other methods (20 percent).

The daughters of well-educated women were more likely than those of less-educated women to have used condoms at first intercourse, regardless of race. Twenty-four percent of daughters of white women with 16 years of education had used the condom at first intercourse, compared with only 19 percent of daughters of women with nine years of education. Among black women, 18 percent of daughters of women with 16 years of schooling had used the condom at first intercourse, compared with 12 percent of daughters of women with nine years of schooling.

Pill use at first intercourse, however, was negatively associated with mother's education among whites: Eleven percent of white teenagers with mothers in the lowest education group had used the pill at first intercourse, while only six percent of those with mothers in the highest education category had done so. Among blacks, pill use did not vary by mother's education. For both blacks and whites, teenagers with more educated mothers were less likely to have used no method at first intercourse.

White teenagers from intact homes were more likely than white teenagers from homes that were not intact to have used the condom at first intercourse (24 percent vs. 17 percent) and were less likely to have used no method (46 percent vs. 53 percent). There was only a small difference in condom use at first intercourse between black adolescents from intact homes and those from homes that were not intact (15 percent vs. 12 percent). As with white adolescents, blacks from intact homes were less likely than other blacks to have used no method at first intercourse (65 percent vs. 71 percent).

The greatest differences in method choice at first intercourse were between white fundamentalist Protestants and women in the other religion categories: Three percent of white fundamentalists had used a condom at first intercourse, compared with 22–26 percent of white nonfundamentalists. White fundamentalists were also substantially more likely to

have used no method at first intercourse than were other white women (68 percent vs. 45–50 percent). These differences were not found among blacks.

Among blacks, there were large differences in both condom use and use of no method between those living in urban areas and those in rural ones: Compared with rural black women, urban blacks were substantially less likely to have used the condom at first intercourse (11 percent vs. 23 percent) and were substantially more likely to have used no method (71 percent vs. 58 percent).

Method choice at first intercourse also varied greatly by region of residence: Both blacks and whites who were living in the West were less likely than others to have used a condom at first intercourse. In addition, blacks living in the West were more likely than those living elsewhere to have used the pill, whereas whites living in the West were more likely than those living elsewhere to have used no method at first intercourse and those living in the Northeast were less likely than others to have used no method.

Using life-table estimates, the researchers determined the probability that an adolescent would have initiated contraceptive use in given time segments following first intercourse. About half of white teenage women and about one-third of black adolescents had practiced contraception at first intercourse. Among the white women who had not, fewer than one-third had begun using contraceptives within one month of first intercourse; about one-fifth of the remainder began 1–3 months later. About one-fifth of the black women who had not used contraceptives at first intercourse began using them within the next month, and approximately one-eighth of those who had not begun by that time initiated use 1–3 months following first intercourse. Although it could be argued that many adolescents might not have had intercourse again soon after first intercourse, the investigators found that over 70 percent of the women reported having had intercourse again within three months of their first intercourse.

Although the condom was the most commonly used method at first intercourse, it did not remain the preferred method when use began after first intercourse. Among blacks, for example, teenagers who began using a method at some time during the year after first intercourse were more likely to begin using the pill than any other method. Whites were about as likely to choose the pill as the condom if they began to use a method in the first four

*Contraceptive choice was coded into four categories: condom, pill (including one percent of women who had used the IUD), other methods (mostly withdrawal) and no method.

†The investigators caution that differences may not all be statistically significant.

months after first intercourse, but thereafter, they were twice as likely to choose the pill as they were to choose the condom.

Finally, using logistic regression models, the researchers determined the effects of demographic and socioeconomic variables on the probability that an adolescent initiated contraceptive use up to one year after first intercourse. Few variables had any significant ($p < .05$) effects for intervals following first intercourse. Among blacks, only family status and religion significantly affected the probability of initiating use following first intercourse: Compared with other adolescents, those from an intact family at age 14 and those who were

fundamentalist Protestants were significantly more likely to have initiated method use within one month of first intercourse. Among whites, fundamentalist teenagers were significantly less likely than others to have begun contraceptive use within one month of first intercourse, Catholic teenagers were more likely to have begun using a method 1-3 months later, and teenagers from the West were more likely to have initiated use 7-12 months later.

The authors conclude that although their findings provide a good starting point, they can only speculate why social status is positively associated with condom use at first intercourse but negatively associ-

ated with pill use. They hypothesize that daughters of better-educated women may have been more aware that condoms prevent disease, more aware that the pill can cause side effects or less likely to go to family planning clinics (where the pill is often the most commonly dispensed method). As their data cannot provide a definitive answer, the authors regret that "we do not know more about [the women's] motivations for using condoms. . . ."—P. Rind

Reference

1. J. R. Kahn, R. R. Rindfuss and D. K. Guilkey, "Adolescent Contraceptive Method Choices," *Demography*, 23:323, 1990.

Risk of Breast Cancer Is Not Significantly Elevated Among Women Who Have Ever Relied on the Pill

Ever having used the pill does not in itself appear to increase a woman's likelihood of developing breast cancer. However, among premenopausal women over age 45, cases were significantly more likely to have used the pill for five or more years than were controls drawn from the community. Cases who had never had children were also more likely to have used the pill for at least five years compared with matched hospital controls, but the difference was not statistically significant. These are some of the main findings of a case-control study that examined associations between the pill and breast cancer.¹

Researchers used previously unanalyzed interview data collected between April 1977 and December 1978 in North Carolina. Interviews were conducted with 158 patients with histologically confirmed breast cancer and with members of two separate control groups. One control group consisted of 326 hospital patients matched for five-year age-group, race, admission date and hospital. The second group was made up of 1,140 women aged 30 and older living in counties served by the participating hospitals. The cases and the hospital controls were interviewed during their hospital stays; the community controls were interviewed in their homes. Roughly three-quarters of the respondents were white. Women over age 60 were excluded from the analysis, since they were beyond reproductive age in 1960, the year in which the pill was approved for contraceptive use in the United States. In addition, women who had a history of breast cancer or who had breast or gynecologic problems were excluded from the two control groups. The investigators conducted multivariate logistic regression analyses, con-

trolling for factors that could potentially confound the association between pill use and breast cancer—age, race, education, age at first birth, menopausal status, and personal and family history of breast disease.

Cases and controls differed significantly on several social, demographic and medical history variables. For example, 50 percent of the cases had reached menopause, compared with 37 percent of the hospital controls and 61 percent of the community controls. Seventy percent of the cases had at least a high school diploma, compared with approximately 57 percent in both control groups. Furthermore, 11 percent of family members of the cases had a history of breast cancer, compared with only four percent among controls. Roughly similar proportions of cases and controls had ever used the pill (42 percent of cases, 42 percent of hospital controls and 48 percent of community controls).

According to the multivariate analysis, there was no overall association between breast cancer and oral contraceptive use: Cases were approximately as likely as controls to have ever used oral contraceptives. There were also no overall associations according to age at first pill use, timing of use related to first birth, duration of use, or time since first or last use. The multivariate analysis failed to show a relationship between pill use and breast cancer among women who had borne children. Among women who had not given birth, those who had used the pill for five or more years were at a seemingly elevated risk of breast cancer: The adjusted odds ratios indicated that cases were 7.8 times more likely than hospital controls, and 2.3 times more likely than community

controls, to have used the pill for five or more years. However, this finding was not statistically significant and was based on a very small number of pill users who had never had children.

There was no significant difference in the risk of breast cancer according to menopausal status, regardless of duration of pill use. However, when the researchers restricted the analysis further by age-group, they found that premenopausal breast cancer patients aged 45-59 were significantly more likely than comparable community controls (adjusted odds ratio of 8.5) to have used the pill for five or more years. (However, the 95 percent confidence interval, 2.2-33.2, was very wide.) Although comparison with the hospital controls also showed an increased probability (odds ratio of 3.4), that finding was not statistically significant. The analysis revealed no similar association between pill use and breast cancer among postmenopausal women 45-59 years of age. Moreover, the results suggest that the risk of breast cancer might even have decreased among pill users aged 25-44, although not significantly.

According to the researchers, the inclusion of two different control groups reinforces the validity of their "generally reassuring" findings for pill users: Young women who have ever used the pill, regardless of the duration of use, were at no elevated risk of breast cancer. Similarly, there was no increased risk among women who began using the pill before their first birth or before age 25, although a lack of data on the specific years of pill use could have limited the reliability of those results.

Childless women who had taken the pill for at least five years were at a higher,

DIGEST

although nonsignificant, risk than were parous women. The researchers surmise that the biological changes in breast cells

occurring during pregnancy could be responsible for this effect. The findings of an association between breast cancer and pill use among premenopausal women over age 45 is not supported by any other research, the investigators point out, and may have been caused by chance. They conclude that because of the small numbers of study subjects on which the find-

ings were based, and the multiple stratifications of data needed to obtain them, "both of these observations [of increased risk] are tentative."—L. Remez

Reference

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State Legislation . . .

(Continued from page 85)

Prospects for 1991

The struggle over the legal right to abortion and the availability of abortion to all women has begun anew in the state legislatures, but this year may prove to be different from 1990. Because this is not an elec-

tion year, legislators may feel free to be more unrestrained and unpredictable in their legislative proposals and votes rather than stay in the safe, middle ground, as they did in 1990. The confirmation to the U.S. Supreme Court of David Souter, whose vote could be crucial to overturning or eroding the right to a legal abortion, has left many legislators with a desire to test the waters.

Barely two months into the 1991 legislative year, it is clear that antiabortion activists are again vigorously pursuing last year's two-pronged approach: chipping away at abortion rights and trying to ban all or most abortions outright. On the other side, abortion rights activists are redoubling their efforts not only to defeat antiabortion measures but also to enact reproductive rights legislation.

Legislators' response to the fact that teenagers engage in sexual activity has always been mixed. Hundreds of bills have been introduced in the past few years regarding sex education, family planning, school health services and programs to help pregnant and parenting teens. However, such legislation has not been enacted without a price: Much of what is actually in effect restricts access to information, forbids school employees from dispensing contraceptives and avoids the primary issue of preventing pregnancy. The major trend in this area (which will most likely carry over to 1991) is the considerable drop-off in interest in the entire subject of teenage pregnancy—ironic in light of new studies documenting an increase in the number of sexually active female teenagers and an increase in teenage birthrates, the first in almost two decades.

In 1991, it is expected that the fiscal crunch at the state level will largely halt further expansions of prenatal care programs for low-income women and slow the creation of treatment programs for pregnant women who abuse drugs or alcohol. However, the legislators' interest in coming to terms with such issues as the large numbers of women in the workforce,

and the need for employer-sanctioned family leave, remains high. Without federal mandates or guidance on offering family and medical leave in the workplace, legislatures will undoubtedly continue to enact a patchwork of laws requiring and regulating leaves of absence.

Since 1983, state lawmakers have been grappling with myriad issues and controversies surrounding AIDS. The steady increase in the number of AIDS-related bills introduced and enacted peaked in 1989, with a significant decline in 1990; that downward trend is evident again this year.

For the most part, the AIDS-related bills introduced in 1991 mirror last year's, with no special efforts directed toward women. While Federal legislation enacted in 1990 provides new funding for AIDS counseling, testing and early intervention medical therapies, for which family planning clinics may apply, very few bills that deal directly with women's unique and growing need for education, counseling and treatment have been approved by state legislatures. As in the past, the focus of most 1991 AIDS legislation concerning women continues to be on testing prostitutes, requiring sexual offenders to report test results to their victims, and preventing the perinatal transmission of AIDS.

Achieving parenthood is not always easy, or even natural. For years, legislators have enacted laws to regulate adoption and artificial insemination, and have recently begun to deal with other infertility-related issues, such as insurance coverage for diagnosis and treatment of infertility. They most likely will deal with each of these issues again this year, but will also concentrate on surrogacy contracts and the new reproductive technologies that have created many ethical and legal questions that are still unresolved. In 1991, legislation is also expected to be introduced in areas that lawmakers have barely touched on in the past: embryo transplants; cryopreservation; donation of the ovum, the embryo or gametes; and in vitro and in vivo techniques.

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Books in Review

People vs. the Environment

The Population Explosion

by Paul R. Ehrlich and Anne H. Ehrlich,
Simon & Schuster, New York, N.Y., 1990,
\$18.95, 320 pp.

Reviewed by Jodi L. Jacobson

The publication of *The Population Explosion*, by Paul and Anne Ehrlich, follows by two decades Paul Ehrlich's first major work on the subject, *The Population Bomb*. While the earlier book served to alert the general public to the likely social, economic and environmental consequences of rapid population growth, the new book tells us that, at 5.3 billion and rising, the human population bomb has now been "detonated," and that we must do whatever is within our means to clean up the resulting mess.

Most readers will find the Ehrlichs' fluid writing and well-researched presentation of issues compelling and persuasive. In its multiple roles as a chronicle of the decline in local and global environmental support systems, a useful reference on demographic concepts such as exponential growth and momentum, a treatise on the problems associated with rapid population growth and a guide to political action, *The Population Explosion* is highly readable and comprehensive.

The book arrives at a critical juncture in the evolution of public debate on the relationship of increasingly worrisome demographic and environmental trends. As we emerge from what is now commonly referred to as "the lost decade of the eighties," leaders in international development are seeking a renewed political and financial commitment to programs aimed at slowing population growth and coping with ecological degradation. Not surprisingly, those convinced of the need to accord these issues top priority on every na-

tion's agenda view the next 10 years as a period that will "make or break" the fate of the planet.

This urgency is warranted. An additional one billion people will be added to the world's population by the turn of the century. Current estimates project a global population of over nine billion by 2030, a near doubling in less than 40 years. Given such a scenario, the prospects for restoring the ecosystems upon which human beings ultimately depend appear bleak indeed. But, as the Ehrlichs acknowledge early in the book, "the assault . . . upon the environment and resources of the planet is not just a matter of brute numbers of people. Rather it is what those people do; it is their impact on the things we care about—on each other, on nonrenewable resources, and above all on the environmental systems that sustain us" [p. 58].

It has long been recognized that people are the root cause of the deterioration of air, soils and water, whether through pollution or through overuse. Human beings are rapidly consuming finite resources such as oil and destroying renewable ones such as forests. More recent additions to this list of ills are vast global changes such as the expected warming of the earth's atmosphere caused by the buildup of "greenhouse gases" like carbon dioxide, and the depletion of the ozone layer resulting from the use of chlorofluorocarbons. These problems are complicated by their interconnections: Net losses of forest cover worldwide, for example, increase atmospheric carbon dioxide. If we act now, we can hope to reverse the decline in renewable resources locally within a matter of years or decades; if we do not, we risk irreversible global changes.

Meanwhile, we find ourselves backsliding in the struggle to meet basic human needs. Despite decades of economic growth, the number of people who lack access to adequate food and health care, clean water, good housing and education is greater than ever before. That a growing world population will exacerbate these problems, as the Ehrlichs' book points out, is not in dispute. But the book is flawed by the Ehrlichs' eagerness to attribute virtually all of the world's social and environmental ills to overpopulation. The authors compromise their arguments by tracing everything from homelessness in the United States to deforestation in the tropics back to population size, giving short shrift to the roles that poverty, inequality and consumption play in current demographic and environmental trends. As many studies show, high fertility rates in developing

countries reflect persistent poverty and political powerlessness, particularly among women; nevertheless, the Ehrlichs' strident calls for demographic targets, immigration quotas and absolute reductions in the size of the global population are barely tempered by scattered references to the need to encourage better use of resources or to address the problem of poverty, clearly the most effective steps in solving environmental problems in the short run.

One of the major weaknesses in the Ehrlichs' argument stems from their biased application of "carrying capacity" to the problems of environmental degradation. Carrying capacity is a concept used by biologists to describe the relationship between the size of an animal population and the capacity of the surrounding environment to support it. Applying this concept to human populations is inherently difficult because, unlike other species, humans can manipulate natural resources through technology.

They also fail to acknowledge the extent to which the consumption patterns of a small but privileged share of the earth's population contribute to environmental problems. For instance, there is the issue of climate change. The burning of fossil fuels was the source of 21 billion of the total 24 billion tons of carbon dioxide released into the atmosphere in 1988. (Deforestation and other factors make up the rest.) Seventy percent of fossil fuel emissions derived from activity in developed countries, which together make up only 25 percent of the world's population. The average American, for example, consumes 26 times as much fossil fuel as does the average South Asian. Yet the Ehrlichs claim that because the "atmospheric concentrations of greenhouse gases are tightly tied to population size . . . there is no practical way to achieve the necessary reduction in greenhouse emissions without population control" [p. 59].

By changing their habits, U.S. consumers alone could make a tremendous contribution to reducing carbon emissions long before any changes in demographic trends could have a notable impact. Clearly, the earth could not support 10 billion people living at the U.S. level of consumption. But given that we are unlikely, barring draconian measures, to end up with fewer than eight billion people by the middle of the next century, we must make changing consumption patterns a major focus of policy-making today. Most current models suggest that to slow or prevent human-induced climate change, the world community will have to reduce total emissions

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of carbon dioxide by some 50–70 percent by the middle of the next century. In fact, more efficient use of energy and the development and popularization of renewable energy technologies could keep total emissions to six billion tons in 2010 instead of the nine billion tons suggested by current trends, even taking into account increases in the world's population.

Over the long term, of course, the rate of change in global carbon emissions will depend on the size of the world's population. But, even in the most populous countries, the choices made today about energy use are as important as future population size. Although per capita emissions of carbon in most developing countries are far lower than in industrial countries, many make up for this by the sheer size of their populations. The 1.3 billion Chinese emit only 0.6 tons per person annually, but together account for 11 percent of annual global emissions. Even if the Chinese were the only people on earth, but lived as the 250 million in the United States do, the world would still face the threat of climate change. Unfortunately, China is now mining its extensive coal reserves and imitating the West in energy-intensive patterns of industrialization and transport.

The Ehrlichs are most persuasive in their comprehensive discussion of the importance of population in relation to food supply, to which they devote two chapters. As the book points out, the chronic hunger and malnutrition evident throughout the world are in part related to purchasing power, consumption patterns and the economics of food distribution. The Ehrlichs estimate that about a billion or so people in the world, mostly in wealthy countries, are "too well-fed"; this group uses about one-third of the world's grain for livestock feed to provide themselves with meat, eggs and dairy products. An additional three billion people, many of them on a meatless diet, are adequately nourished. Another billion are chronically malnourished, half of them to such an extent that their health is threatened or their growth stunted. The Ehrlichs note that if food were better distributed, the poor would be better fed, but not much would be left over to accommodate an increase in population. Worldwide, food production has increased somewhat faster than population growth, but only through the use of resource-intensive farming practices that are themselves the culprit in much environmental damage. Moreover, food production has fallen behind population growth in two regions, Africa and Latin America. And the Ehrlichs are rightfully troubled by food

production trends in the two most populous countries, China and India.

The Ehrlichs point out that population growth compromises food production and improved nutrition in much of the world. But putting all or most of the blame on population growth would be like constructing only half the puzzle. In these chapters, by discussing skewed patterns of land distribution and agricultural policies that ignore the needs of the poor as well as population growth, the authors provide the missing pieces. In Brazil, for example, one percent of landowners own 45 percent of the available arable land. Much of the deforestation in the Amazon basin, often blamed solely on population growth, can be traced back to the land tenure situation, which forces poor farmers to clear virgin forest. Throughout the rest of Latin America, as in India and much of Africa, land tenure patterns, the mechanization of farming and the subsidization of export crops to earn foreign exchange have compromised the ability of small farmers to produce food and have increased the numbers of landless people.

Unfortunately, *The Population Explosion* virtually ignores the powerful and all-pervasive politics of reproduction. The discussion of abortion and contraception is facile, refers only to the United States and is sometimes ill-informed. The authors state, for example, that "abortion is a crude and relatively dangerous method of birth control even when legal and conducted under medical auspices" [p. 196]. Women's health issues are also absent: A chapter on population and public health fails to mention the enormous toll taken by maternal mortality and morbidity.

The Ehrlichs strongly advocate "population control" rather than, as they put it, "the more euphemistic 'family planning' [which] all too often means planning to have too many children but spacing them more evenly" [p. 190]. (So much for voluntary family planning.) In supporting their call for population control, the Ehrlichs point out that 97 percent of women in Rajasthan, India, who refuse birth control are "well-informed on family planning programs." The problem, they declare, "is that family planning focuses on the needs and desires of individuals and couples; population control focuses on the needs of societies as well." They then add, in a somewhat confused reflection on these statements, that "of course, population control need not be coercive" [p. 190].

These statements are troubling for several reasons. First, there is no discussion

whatsoever of the cultural and economic obstacles to closing the gap between knowledge and practice in contraceptive use. In societies where cultural constraints on women are strong and where women remain economically and politically subservient to men, an individual woman has little, if any, power to determine at what stage she becomes sexually active, to whom she is bonded, when sex will take place, or when and how to bear children. Once a woman marries, decisions about the timing and number of births are more often the prerogative of her husband and in-laws than of the woman herself. Without considering these issues, the Ehrlichs cannot hope to "end the population explosion humanely."

Furthermore, use is often limited by cost, availability or the fact that contraceptives on the market don't suit women's needs. Even when the means to prevent pregnancy are available to women in the Third World (and this is relatively rare), lack of spousal support often leads to high rates of contraceptive failure.

Last, the documented increase in unmet need for family planning worldwide suggests that governments and policymakers have not gone far enough in making family planning or primary health care a priority, or in finding out what women perceive their needs to be and how these needs might best be met.

The Ehrlichs argue that "limiting human numbers will not alone end warfare, environmental deterioration, poverty, racism, religious prejudice, or sexism; it will just buy us the opportunity to do so" [p. 23]. A different analysis leads to the conclusion that many of these social ills are part and parcel of global population trends and must be addressed from the very start.

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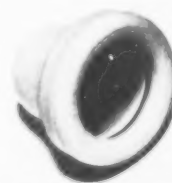
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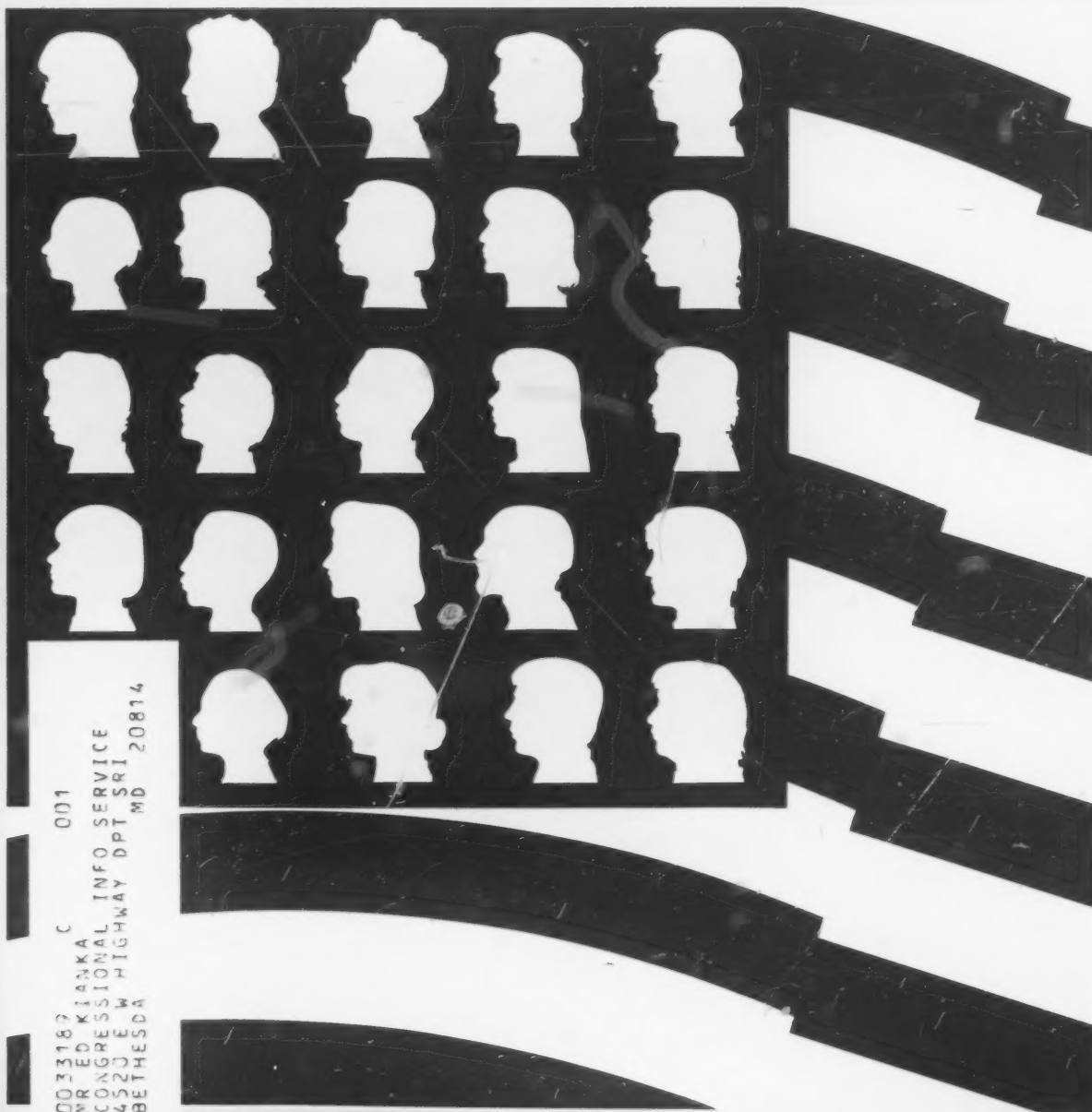
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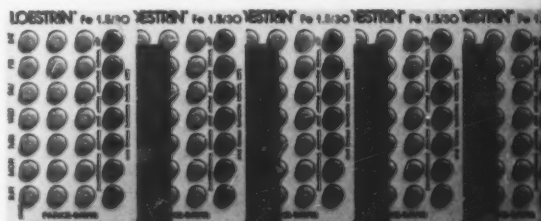
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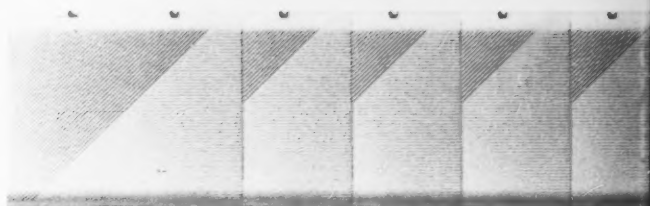
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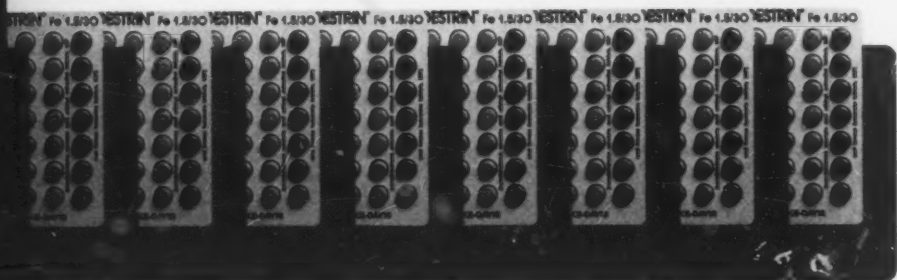
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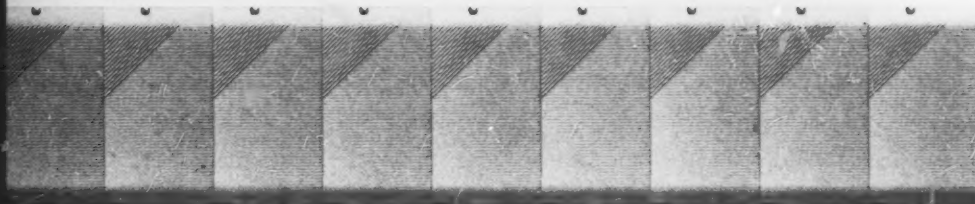
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INDICATIONS AND USAGE: Loestrin 21 and Loestrin 28 are indicated for the prevention of pregnancy in women who elect to use oral contraceptives (OCs) as a method of contraception. **CONTRAINDICATIONS:** OCs should not be used in women who currently have the following conditions: 1. Thrombophlebitis or thromboembolic disorders. 2. A past history of deep vein thrombophlebitis or thromboembolic disorders. 3. Cerebral vascular or coronary artery disease. 4. Known or suspected carcinoma of the breast. 5. Carcinoma of the endometrium or other known or suspected estrogen-dependent neoplasia. 6. Undiagnosed abnormal genital bleeding. 7. Cholestasis jaundice of pregnancy or jaundice with prior pill use. 8. Hepatic adenomas or carcinomas. 9. Known or suspected pregnancy.

WARNINGS

Cigarette smoking increases the risk of serious cardiovascular side effects from oral contraceptive use. This risk increases with age and with heavy smoking (15 or more cigarettes per day) and is quite marked in women over 35 years of age. Women who use oral contraceptives should be strongly advised not to smoke.

The use of OCs is associated with increased risks of several serious conditions including myocardial infarction, thromboembolism, stroke, hepatic neoplasia, and gallbladder disease, although the risk of serious morbidity or mortality is very small in healthy women without underlying risk factors. The risk of morbidity and mortality increases significantly in the presence of other underlying risk factors such as hypertension, hyperlipidemias, obesity and diabetes. Practitioners prescribing OCs should be familiar with the following information relating to these risks. The information contained in the package insert is principally based on studies carried out in patients who used OCs with higher formulations of estrogens and progestogens than those in common use today. The effect of long-term use of the OCs with lower formulations of both estrogens and progestogens remains to be determined. Throughout this labeling, epidemiological studies reported are of two types: retrospective or case control studies and prospective or cohort studies. Case control studies provide a measure of the relative risk of a disease, namely, a ratio of the incidence of a disease among OC users to that among nonusers. The relative risk does not provide information on the actual clinical occurrence of a disease. Cohort studies provide a measure of attributable risk, which is the difference in the incidence of disease between OC users and nonusers. The attributable risk does provide information about the actual occurrence of a disease in the population. For further information, the reader is referred to a text on epidemiological methods.

1. Thromboembolic Disorders and Other Vascular Problems: a. Myocardial Infarction: An increased risk of myocardial infarction has been attributed to OC use. This risk is primarily in smokers or older women, and underlying risk factors for coronary artery disease such as hypertension, hypercholesterolemia, morbid obesity, and diabetes. The relative risk of a heart attack for current OC users has been estimated to be two to six. The risk is very low under the age of 30. Smoking in combination with OC use has been shown to contribute substantially to the incidence of myocardial infarction in women in their mid-thirties or older with smoking accounting for the majority of excess cases. Mortality rates associated with circulatory disease have been shown to increase substantially in smokers over the age of 35 and nonsmokers over the age of 40 among women who use OCs. OCs may compound the effects of well-known risk factors such as hypertension, diabetes, hyperlipidemias, age and obesity. In particular, some progestogens are known to decrease HDL cholesterol levels and cause glucose intolerance, while estrogens may create a state of hyperinsulinism. OCs have been shown to increase blood pressure in users (see section 9 in WARNINGS). Similar effects on risk factors have been associated with an increased risk of heart disease. OCs must be used with caution in women with cardiovascular disease risk factors. **b. Thromboembolism:** An increased risk of thromboembolic and thrombotic disease associated with the use of OCs is well established. Case control studies have found the relative risk of users compared to nonusers to be 3 for the first episode of superficial venous thrombosis, 4 to 11 for deep vein thrombosis or pulmonary embolism, and 1.5 to 6 for women with predisposing conditions for venous thromboembolic disease. Cohort studies have shown the relative risk to be somewhat lower, about 3 for new cases and about 4.5 for new cases requiring hospitalization. The risk of thromboembolic disease due to OCs is not related to length of use and disappears after pill use is stopped. A two- to four-fold increase in relative risk of postoperative thromboembolic complications has been reported with the use of OCs. The relative risk of venous thrombosis in women who have predisposing conditions is twice that of women without such medical conditions. If feasible, OCs should be discontinued at least four weeks prior to and for two weeks after elective surgery of a type associated with an increase in risk of thromboembolism and during and following prolonged immobilization. Since the immediate postpartum period is also associated with an increased risk of thromboembolism, OCs should be started no earlier than four to six weeks after delivery in women who elect not to breast-feed. **c. Cerebrovascular diseases:** OCs have been shown to increase both the relative and attributable risks of cerebrovascular events (thrombotic and hemorrhagic strokes), although, in general, the risk is greatest among users (>35 years), hypertensive women who also smoke. Hypertension was found to be a risk factor for both users and nonusers for both types of strokes, while smoking interacted to increase the risk for hemorrhagic strokes. In a large study the relative risk of thrombotic strokes has been shown to range from 3 for normotensive users to 14 for users with severe hypertension. The relative risk of hemorrhagic stroke is reported to be 1.2 for nonsmokers who used OCs, 2.6 for smokers who did not use OCs, 76 for smokers who used OCs, 1.6 for normotensive users, and 25.7 for users with severe hypertension. The attributable risk is also greater in older users.

d. Dose-related risk of vascular disease from OCs: A positive association has been observed between the amount of estrogen and progestogen in OCs and the risk of vascular disease. A decline in serum high density lipoproteins (HDL) has been reported with many progestational agents. A decline in serum high density lipoproteins has been associated with an increased incidence of ischemic heart disease. Because estrogens increase HDL cholesterol, the net effect of an OC depends on a balance achieved between doses of estrogen and progestogen and the nature and absolute amount of progestogens used in the contraceptives. The amount of both hormones should be considered in the choice of an OC. Minimizing exposure to estrogen and progestogen is in keeping with good principles of therapeutics. For any particular estrogen-progestogen combination, the lowest regimen prescribed should be one which contains the least amount of estrogen and progestogen that is compatible with a low failure rate and the needs of the individual patient. New acceptors of OC agents should be started on preparations containing the lowest dose of estrogen which produces satisfactory results for the patient.

e. Persistence of risk of vascular disease: There are two studies which have shown persistence of risk of vascular disease for ever users of OCs. In a study in the United States, the risk of developing myocardial infarction after discontinuing OCs persists for at least 9 years in women 40-49 years who had used OCs for 5 or more years, but this increased risk was not demonstrated in other age groups. In another study in Great Britain, the risk of developing cerebrovascular disease persisted for at least 6 years after discontinuation of OCs, although excess risk was very small. However, both studies were performed with OC formulations containing 50 micrograms or higher of estrogen.

2. Estimates of Mortality from Contraceptive Use: One study gathered data from a variety of sources which have estimated the mortality rate associated with different methods of contraception at different ages. These estimates include the combined risk of death associated with contraceptive methods plus the risk attributable to pregnancy in the event of method failure. Each method of contraception has its specific benefits and risks. The study concluded that with the exception of OCs, users 35 and older who smoke and 40 and older who do not smoke, mortality associated with all methods of birth control is low and below that associated with childbirth. However, smokers 35 and older and nonsmokers 40 and older who use OCs have an increase in mortality higher than those using other methods of birth control. These facts must be weighed in conjunction with failure rates for other methods and the risk associated with subsequent pregnancy.

3. Carcinoma of the Reproductive Organs: Numerous epidemiological studies have been performed on the incidence of breast, endometrial, ovarian and cervical cancer in women using OCs. The overwhelming evidence in the literature suggests that use of OCs is not associated with an increase in the risk of developing breast cancer, regardless of the age and parity of first use or with most of the marketed brands and doses. The Cancer and Steroid Hormone (CASH) study also showed no latent effect on the risk of breast cancer for at least a decade following long-term use. A few studies have shown a slightly increased relative risk of developing breast cancer, although the methodology of these studies, which included differences in examination of users and nonusers and differences in age at start of use, has been questioned. Some studies suggest that OC use has been associated with an increase in the risk of cervical intraepithelial neoplasia in some populations of women. However, there continues to be controversy about the extent to which findings may be due to differences in sexual behavior and other factors. In spite of many studies of the relationship between OC use and breast and cervical cancers, a cause and effect relationship has not been established.

4. Hepatic Neoplasia: Benign hepatic adenomas are associated with OC use, although the incidence of benign tumors is rare in the United States. Indirect calculations have estimated the attributable risk to be in the range of 3.3 cases/100,000 for users, a risk that increases after four or more years of use. Rupture of rare, benign hepatic adenomas may cause death through intraabdominal hemorrhage. Studies from Britain have shown an increased risk of developing hepatocellular carcinoma in long-term (>6 years) OC users. However, these cancers are extremely rare in the US, and the attributable risk (the excess incidence) of liver cancers in OC users approaches less than one per million users. **5. Ocular Lesions:** There have been clinical case reports of retinal thrombosis associated with the use of OCs. OCs should be discontinued if there is unexplained partial or complete loss of vision, onset of proptosis or diplopia, papilledema, or retinal vascular lesions. Appropriate diagnostic

and therapeutic measures should be undertaken immediately.

6. OC Use Before or During Early Pregnancy: Risk of Birth Defects: Extensive epidemiological studies have revealed no increased risk of birth defects in women who have used OCs prior to pregnancy. Studies also do not suggest a teratogenic effect, particularly insofar as cardiac anomalies and limb reduction defects are concerned, when taken inadvertently during early pregnancy. The administration of OCs to induce a miscarriage should not be used as a test for pregnancy. OCs should not be used during pregnancy to treat threatened or habitual abortion. It is recommended that for any patient who has missed two consecutive periods, pregnancy should be ruled out before continuing OC use. If the patient has not adhered to the prescribed schedule, the possibility of pregnancy should be considered at the time of the first missed period. OC use should be discontinued if pregnancy is confirmed.

7. Gallbladder Disease: Earlier studies have reported an increased lifetime relative risk of gallbladder surgery in users of OCs and estrogens. More recent studies, however, have shown that the relative risk of developing gallbladder disease among OC users may be minimal. The recent findings of minimal risk may be related to the use of OC formulations containing lower hormonal doses of estrogens and progestogens. **8. Carbohydrate and Lipid Metabolic Effects:** OCs have been shown to cause glucose intolerance in a significant percentage of users. OCs containing greater than 75 micrograms of estrogen cause hyperinsulinism, while lower doses of estrogen cause less glucose intolerance. Progestogens increase insulin secretion and create insulin resistance; this effect varies with different progestational agents. However, in the nondiabetic woman, OCs appear to have no effect on fasting blood glucose. Because of these demonstrated effects, prediabetic and diabetic women should be carefully observed while taking OCs. A small proportion of women will have persistent hypertriglyceridemia while on the pill. As discussed earlier (see WARNINGS 1a and 1b), changes in serum lipoproteins and lipoprotein levels have been reported in OC users. **9. Elevated Blood Pressure:** An increase in blood pressure has been reported in women taking OCs, and this increase is more likely in older users and with continued use. Data from the Royal College of General Practitioners and subsequent randomized trials have shown that the incidence of hypertension increases with increasing concentrations of progestogens. Women with a history of hypertension or hypertension-related diseases or renal disease should be encouraged to use another method of contraception. If women elect to use OCs, they should be monitored closely, and if a significant elevation of blood pressure occurs, OCs should be discontinued. For most women, elevated blood pressure will return to normal after stopping OCs, and there is no difference in recurrence of hypertension after discontinuation of OCs.

10. Headaches: The onset and continuation of headaches may be related to the use of OCs. **11. Bleeding Irregularities:** Breakthrough bleeding and spotting are sometimes encountered in patients or OCs, especially during the first three months of use. Nonhormonal causes should be considered and adequate diagnostic measures taken to rule out malignancy or pregnancy in the event of breakthrough bleeding, as in the case of any abnormal vaginal bleeding. If pathology has been excluded, time or a change to another formulation may solve the problem. In the event of amenorrhea, pregnancy should be ruled out. Some women may encounter postpill anovulation or amenorrhea, especially when a new pattern is initiated. **12. Precipitous Effects:** The onset and continuation of these effects may be related to the use of OCs and should be taken prior to the initiation or resumption of OCs and at least annually during use of OCs. These physical examinations should include special reference to blood pressure, breast, abdomen and pelvic organs, including cervical cytology, and relevant laboratory tests. In case of undiagnosed, persistent or recurrent abnormal vaginal bleeding, appropriate diagnostic measures should be conducted to rule out malignancy. Women with a strong family history of breast cancer or who have breast nodules should be monitored with particular care.

2. Lipid Disorders: Women who are being treated for hyperlipidemias should be followed closely if they elect to use OCs. Some progestogens may elevate LDL levels and may render the control of hyperlipidemias more difficult. **3. Liver Function:** If jaundice develops in any woman receiving such drugs, the medication should be discontinued. Steroid hormones may be poorly metabolized in patients with impaired liver function. **4. Fluid Retention:** OCs may cause some degree of fluid retention. They should be prescribed with caution, and only with careful monitoring, in patients with conditions which might be aggravated by fluid retention. **5. Emotional Disorders:** Women with a history of depression should be carefully observed and the drug discontinued if depression recurs to a serious degree. **6. Contact Lenses:** Contact lens wearers who develop visual changes or changes in lens tolerance should be assessed by an ophthalmologist.

7. Drug Interactions: Reduced efficacy and increased incidence of breakthrough bleeding and menstrual irregularities have been associated with concomitant use of rifampin. A similar association, though less marked, has been suggested with barbiturates, phenylbutazone, phenyl sodium and possibly with griseofulvin, ampicillin and tetracyclines. **8. Interactions with Laboratory Tests:** Certain endocrine and liver function tests and blood components may be affected by OCs: a. Increased prothrombin and factors VII, VIII, IX, and X; decreased antithrombin; b. increased renin; c. increased platelet aggregability; d. increased thyroid binding globulin (TBG) leading to increased circulating total thyroid hormone as measured by protein-bound iodine (PBI), T4 by column or by radioimmunoassay. Free T3 resin uptake is decreased, reflecting the elevated TBG; free T4 concentration is unaffected; e. Other binding proteins may be elevated in serum; f. Sex-binding globulins are increased and result in elevated levels of total circulating sex steroids and corticoids; however, free or biologically active levels remain unchanged; g. Triglycerides may be increased; h. Glucose tolerance may be decreased; i. Serum folate levels may be depressed by OC therapy. This may be of clinical significance if a woman becomes pregnant shortly after discontinuing OCs.

9. Carcinogenesis: See WARNINGS section 10. **Pregnancy:** Pregnancy Category X. See CONTRAINDICATIONS and WARNINGS sections. **11. Nursing Mothers:** Small amounts of OC steroids have been identified in the milk of nursing mothers and a low adverse effects on the child have been reported, including jaundice and breast enlargement. In addition, OCs given in the postpartum period may interfere with lactation by decreasing the quantity and quality of breast milk. If possible, the nursing mother should be advised not to use OCs but to use other forms of contraception until she has completely weaned her child. **INFORMATION FOR THE PATIENT:** See patient labeling.

ADVERSE REACTIONS: An increased risk of the following serious adverse reactions has been associated with the use of OCs (see WARNINGS section). Thrombophlebitis, arterial thromboembolism, pulmonary embolism, myocardial infarction, cerebral thrombosis, hyperlipidemia, gallbladder disease, hepatic adenomas or benign liver tumors. There is evidence of an association between the following conditions and the use of OCs, although additional confirmatory studies are needed: Mesenteric thrombosis, retinal thrombosis. The following adverse reactions have been reported in patients receiving OCs and are believed to be drug related: Nausea, vomiting, gastrointestinal symptoms (such as abdominal cramps and bloating), breakthrough bleeding, spotting, change in menstrual flow, amenorrhea, temporary infertility after discontinuance of treatment, edema, melasma which may persist, breast changes: tenderness, enlargement, secretion, change in weight (increase or decrease), change in cervical erosion and secretion, diminution in lactation when given immediately postpartum, cholestatic jaundice, migraine, rash (allergic), mental depression, reduced tolerance to carbohydrates, vaginal candidiasis, change in corneal curvature (sleeping), intolerance to contact lenses, the following adverse reactions have been reported in users of OCs and the association has been neither confirmed nor refuted: Premenstrual syndrome, catarracts, changes in appetite, cystitis like syndrome, headache, nervousness, dizziness, hirsutism, loss of scalp hair, erythema multiforme, erythema nodosum, hemiparesis, chorea, porphyria, impaired renal function, hemolytic uremic syndrome, Budd-Chiari syndrome, acne, changes in libido, coils. While the following adverse reactions or conditions have been reported to be associated with the use of OCs, no causal relationship has been established: Congenital anomalies, Raynaud's disease, sickle cell disease, mitral valve prolapse, increased risk of developing venous thromboembolic disease among women with blood types A, B or AB, as opposed to women with blood type O. **OVERDOSEAGE:** Serious ill effects have not been reported following acute ingestion of large doses of OCs by young children. Overdose may cause nausea and withdrawal bleeding may occur in females. **HOW SUPPLIED:** Loestrin 21 120 is available in dispensers each containing 21 tablets. Each tablet contains 1 mg of norethindrone acetate and 20 mcg of ethinyl estradiol. Available in packages of five dispensers. Loestrin 28 120 is available in dispensers each containing 21 white tablets and 7 brown tablets. Each white tablet contains 1 mg of norethindrone acetate and 20 mcg of ethinyl estradiol. Each brown tablet contains 75 mg ferrous fumarate. Available in packages of five dispensers. Loestrin 28 1530 is available in dispensers each containing 21 tablets. Each tablet contains 15 mg of norethindrone acetate and 30 mcg of ethinyl estradiol. Available in packages of five dispensers. Loestrin 28 1530 is available in dispensers each containing 21 green tablets and 7 brown tablets. Each green tablet contains 15 mg of norethindrone acetate and 30 mcg of ethinyl estradiol. Each brown tablet contains 75 mg ferrous fumarate. Available in packages of five dispensers.

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UPDATE

A Death from Nonsurgical Abortion

On April 9, 1991, a French woman having an early first-trimester abortion with the combination of mifepristone (commonly known as RU 486) and prostaglandin died.¹ Her death, the first with the new treatment, was attributed to cardiovascular shock following administration of the injectable prostaglandin sulprostone. Four deaths related to sulprostone have previously been reported in connection with other medical uses, and two cases of cardiovascular complications reported earlier in nonsurgical abortions also involved the injectable prostaglandin. The 31-year-old woman had had 12 live births and one previous induced abortion, and was a heavy smoker. Last year, following the two serious complications, the French Health Ministry had asked providers not to give the mifepristone-prostaglandin treatment to women older than 35 who smoked or who had other risk factors for cardiovascular problems. Now they are reportedly considering asking physicians to make heavy smoking (20 or more cigarettes per day for the preceding two years) an absolute contraindication.

1. "A Death Associated with Mifepristone/Sulprostone," *Lancet*, 337:969, 1991.

The Come-Hither Glance

The human ovum may transmit a chemical signal to the sperm that both indicates the egg's location and activates the sperm to fertilize it.¹ Researchers collected fluid from the follicles of 40 women and placed it along with human ova in the top of a special two-chambered apparatus that held sperm in the bottom chamber; control versions contained sperm and eggs but not the follicular fluid. They report that there

was "an almost perfect correlation" between the eggs that were eventually fertilized and the chambers containing the follicular fluid, suggesting that some chemical attractant may have been signalling to the sperm. (Similar discoveries have been made for the sea urchin.) The investigators caution that their research is at a preliminary stage, and that a great deal of difficult research remains. However, identification of such a chemical might lead eventually to new treatments for infertility or to new contraceptive methods.

1. L. Roberts, "Does the Egg Beckon the Sperm When the Time Is Right?" *Science*, 252:214, 1991.

Birth Defects and Maternal Age

Babies born to older women appear to be at no greater risk of having nonchromosomal birth defects than babies born to younger mothers, according to a Canadian study involving more than 575,000 births.¹ Investigators identified nearly 27,000 babies from among this group (4.7 percent) who were born with at least one of 43 malformations of unknown cause (ranging from anencephaly to abnormalities of the diaphragm and abdominal wall). For 40 of these 43 birth defects, there was no association between the incidence of the defect and the mother's age. Two other defects were significantly less likely to occur among babies born to older women than among those born to younger women; for one defect, the risk rose steadily up to age 30 and then declined. According to the researchers, "these findings should be reassuring to women who opt to delay childbearing, have tests for chromosomal disorders if aged 35 or over, and do not have conditions with known implications for pregnancy outcome, such as diabetes, rhesus incompatibility, and alcoholism."

1. P. A. Baird, A. D. Sadovnick and I. M. L. Yee, "Maternal Age and Birth Defects: A Population Study," *Lancet*, 337:527, 1991.

Do Antibiotics Thwart the Pill?

Certain antibiotics are believed to increase the risk of ovulation among pill users; however, no sign of such an effect was found in a pair of recent trials. One was a study of 23 West Virginia women aged 18-35 who took two cycles of oral contraceptives and were given the antibiotic doxycycline for seven days starting on day 14 of the pill cycle.¹ The study participants' circulating hormone levels were tracked through the two cycles. None of the women showed any hormonal sign of having experienced ovulation, leading the investigators to comment that "pregnancies . . . attributed to oral contraceptive failure secondary to tetracycline-oral contraceptive interaction could reflect the background failure rate of oral contraceptives or represent an uncommon idiosyncratic response." The other analysis, a British study of similar design that observed 12 long-time pill users, also revealed no hormonal indication of ovulation during the cycle in which the women took the antibiotic temafloxacin.² The investigators conclude that "there is no systematic interaction between temafloxacin and oral contraceptive steroids and . . . there should be no need to use alternative contraceptive precautions when patients taking oral contraceptives are prescribed temafloxacin." However, because both of these studies involved small numbers of women, and because there appears to be a substantial degree of individual variation in circulating hormone levels, the results cannot be considered applicable to all oral contraceptive users.

1. J. L. Neely et al., "The Effect of Doxycycline on Serum Levels of Ethinyl Estradiol, Norethindrone, and Endogenous Progesterone," *Obstetrics & Gynecology*, 77:416, 1991.

2. D. J. Back et al., "The Lack of Interaction Between Temafloxacin and Combined Oral Contraceptive Steroids," *Contraception*, 43:317, 1991.

Update was compiled and written by Michael Klitsch, editor of *Family Planning Perspectives*.

Smoking and Ectopic Pregnancy

The risk of an ectopic pregnancy is about two-thirds greater among women who smoke than among nonsmokers, according to a French case-control analysis, and is doubled among those who smoke at least one-half pack each day.¹ Researchers studied 279 women who were treated for a confirmed ectopic pregnancy at one of seven maternity hospitals in Paris and 279 women who gave birth at the same centers at around the same time. After introducing controls for specific maternity hospital, maternal age, history of appendectomy, previous ectopic pregnancy, prior tubal surgery, prior spontaneous abortion, history of pelvic inflammatory disease, prior use of an IUD, induction of the conception cycle, and use of the combined pill, minipill or IUD at the time of conception, the investigators found that women who were smokers around the time that pregnancy occurred were 68 percent more likely than nonsmokers to have an ectopic pregnancy. Although there was no significantly increased risk among women who smoked 10 or fewer cigarettes daily, those who smoked 11–20 cigarettes per day were twice as likely as nonsmokers to have an ectopic pregnancy. There was no link between the smoking habits of the woman's partner and the risk of ectopic pregnancy.

1. J. Coste, N. Job-Spira and H. Fernandez, "Increased Risk of Ectopic Pregnancy with Maternal Cigarette Smoking," *American Journal of Public Health*, 81:199, 1991.

HIV Testing at Public Clinics

Family planning clinics provided tests for one in seven U.S. women who were tested for human immunodeficiency virus (HIV) through publicly funded programs during 1989 and 1990, but these women's infection rates were substantially lower than those of women tested at other types of clinics.¹ The two-year data on nearly 408,000 women tested as part of voluntary counseling and treatment programs show that 29 percent of tests were conducted at sexually transmitted disease (STD) clinics, 29 percent at special HIV counseling and treatment centers, 15 percent at family planning clinics and 13 percent by prenatal care providers. Only three percent of positive HIV tests occurred at family planning clinics; in contrast, 40 percent and 29 percent of positive tests were taken at HIV counseling and treatment centers and at STD clinics, respectively. Overall seroprevalence rates were 6.3 percent in prisons, 3.7 percent at drug-treatment facilities, 3.0

percent at HIV testing sites, 2.2 percent at STD clinics, 0.9 percent at prenatal and obstetric clinics and just 0.5 percent at family planning clinics.

1. "Characteristics of, and HIV Infection among, Women Served by Publicly Funded HIV Counseling and Testing Services—United States, 1989–1990," *Morbidity and Mortality Weekly Report*, 40:195, 1991.

Better Sex Through Sterilization

Contraceptive sterilization may cause some short-term improvements in married women's sexual satisfaction.¹ Three groups of married San Antonio women—152 who were contraceptive sterilized, 106 whose husbands were sterilized and 83 who were not planning to be sterilized—were interviewed regularly over the course of five years. The women's overall level of satisfaction with their sexual relationship declined slightly over the course of the study in all three groups, but there were no statistically significant differences between the groups, even when the analysis was controlled for a number of social, demographic and psychosocial variables. Neither were there any significant overall differences in the women's satisfaction with their own sexual response, in the frequency with which they wanted to have intercourse or in their coital frequency. However, over the first several years of the study period, the sterilized women and the wives of vasectomized men reported somewhat increased sexual desire, while the women not interested in sterilization reported a steady decline in desire. In addition, during the first year of the study, sterilized women reported a significant increase in coital frequency. The researchers comment that in freeing women from the fear of pregnancy, sterilization "may act as a short-term buffer against the natural tendency for aging and increasing marital duration to depress sexual desire."

1. R. N. Shain et al., "Impact of Tubal Sterilization and Vasectomy on Female Marital Sexuality: Results of a Controlled Longitudinal Study," *American Journal of Obstetrics and Gynecology*, 164:763, 1991.

Why Is Swedish Fertility Rising?

Since the mid-1980s, measures of period fertility in Sweden (such as the total fertility rate, or TFR) have been gradually rising.¹ By 1989, Sweden's TFR had reached 2.02 lifetime births per woman, and it was expected to have surpassed replacement level in 1990. An analysis of fertility patterns in Sweden over the past 15 years reveals that fertility has risen steadily since the late 1970s among women aged 25 or

older, and that Swedish women in their 30s now have higher fertility rates than those in their early 20s. The data reveal that in recent years, among women who had their first birth at ages 27–28 (the median age at first birth in Sweden), the increase in second births within three years of the first birth has been especially strong. The analysis points out that in 1979 and 1980 and again in 1986, the rules governing paid maternity leave were progressively liberalized, so that by 1986, a woman bearing three children within two years could receive at least five consecutive years of paid maternity leave. The researcher concludes that "Swedish couples have a short-term economic motive" to concentrate their childbearing within a relatively short interval, and that this may explain in part the increased levels of childbearing among Swedish women in their 30s.

1. J. M. Hoem, "Social Policy and Recent Fertility Change in Sweden," *Population and Development Review*, 16:735, 1990.

AIDS Risk Among Runaways

From 60 to 70 percent of a group of teenage runaways in New York City had had intercourse in the preceding three months; although the teenagers were generally knowledgeable about AIDS, a substantial proportion had never used condoms.¹ Sixty-four males and 66 females ages 11–17 who were admitted to two shelters for runaway youths in Manhattan and Brooklyn were interviewed. Three-quarters had not lived with their parent or guardian for at least the preceding two weeks. Seventy percent of the males and 59 percent of the females said they had been sexually active; the males reported an average of 4.7 partners and 14.9 acts of intercourse in the preceding three months, while the females said they had had an average of 2.0 partners and had had intercourse 9.9 times. Although 27 percent of the young men and 47 percent of the young women said they never used a condom, 38–39 percent said they always or almost always did so. The teenagers' general knowledge about AIDS was fairly high—they answered 73–74 percent of questions correctly. They also had positive beliefs about the value of preventing AIDS. However, only those with a high stated desire to prevent pregnancy were marginally more likely to have used the condom or to have abstained from intercourse.

1. M. J. Rotheram-Borus and C. Koopman, "Sexual Risk Behaviors, AIDS Knowledge, and Beliefs about AIDS among Runaways," *American Journal of Public Health*, 81:208, 1991.

Adult Sexual Behavior in 1989: Number of Partners, Frequency of Intercourse and Risk of AIDS

By Tom W. Smith

Summary

Questions on sexual behavior that were added to the National Opinion Research Center's 1988 and 1989 General Social Surveys reveal that 97 percent of adult Americans have had intercourse since age 18. Respondents report having an average of about 1.2 sexual partners during the year preceding the survey and nearly 7.2 partners since age 18; men claimed to have had considerably more partners than did women. About one-fifth of adult Americans had no partners during the previous year. Moreover, over a year's time, only 1.5 percent of married people reported having had a sexual partner other than their spouse. On average, adults report engaging in intercourse 57 times per year. About two percent of sexually active adults reported being exclusively homosexual or bisexual during the year preceding the survey, and 5-6 percent have been exclusively homosexual or bisexual since age 18. Seven percent of adults are at relatively high current risk of contracting AIDS—three percent because they have had multiple partners, three percent because they have had unfamiliar partners and one percent because of their sexual orientation. However, 33 percent have engaged in relatively risky behavior at some time since age 18.

Introduction

Sexual behavior may be the most important of all human activities. It is the process by which the species is reproduced, it is the central behavior around which families are formed, and it is a key component

The respondents' average number of lifetime sexual partners has a complex association with age, increasing from 6.1 among those younger than 30 to 9.7 among those aged 40-49 and then falling to 3.5 among those older than 70.

in the emotional lives of individuals. Sexual behavior is also central to a number of social and medical problems: marital difficulties and divorce; rape, incest and child molestation; the reproductive issues of infertility, sterility, contraception, unwanted pregnancy, and abortion; and sexually transmitted disease (STD).

Yet there has probably been less systematic, scientific research on the sexual behavior of Americans than on any other topic of importance. Only one national sample, conducted by the National Opinion Research Center (NORC) for The Kinsey Institute, has focused on sexual behavior,¹ and only about one dozen national surveys have collected any notable information on the topic. Most of these were focused on other matters but included some measures of sexual behavior (such as the National Fertility Studies,² the Leisure Activities Studies,³ the National Surveys of Family Growth,⁴ the General Social Surveys,⁵ the 1970 National Survey of Public Attitudes Toward and Experience with Erotic Materials,⁶ the 1974 Family Planning Evaluation Project,⁷ the 1981 Survey of Problem Drinking Among Women,⁸ and a 1987 *Los Angeles Times* survey⁹).

Similar representative studies of young people have included the National Surveys of Young Women,¹⁰ the National Survey of Young Men,¹¹ the Survey of College Students,¹² the National Longitudinal Survey of Youth¹³ and the National Survey of Adolescent Males.¹⁴ Most included fewer than 10 questions on sexual behavior, and some had only one or two.

The AIDS epidemic currently makes accurate information on sexual behavior

of immediate, life-and-death concern, but the collection of scientific information on sexual matters faces much political opposition.¹⁵ This article reports on results from one small, but notable, source of information on contemporary sexual behavior.

Data

In 1988 and 1989, NORC, at the University of Chicago, sponsored the addition of a small number of questions on sexual behavior onto the General Social Surveys (GSS), a regularly conducted national, full-probability sample of the adult household population of the United States.¹⁶ At the end of the in-person interview, respondents were asked to complete and return (in a sealed envelope) a short, self-administered questionnaire on their sexual behavior. In 1988, the respondents were asked about the number of sexual partners they had had during the past year, the type of relationship they had with these partners, and the partners' gender. In 1989, questions on the frequency of sexual intercourse and the number and gender of sexual partners since age 18 were added. (For the exact wording of each of these questions, see the Appendix.*)

Although they did not go into great depth, the GSS questions allow a preliminary accounting of some of the basic parameters of current (during the preceding 12 months) and past (since age 18) sexual behavior. This article will present the basic

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*This article will not address methodological issues associated with the collection of information on sexual behavior. For a discussion of measurement error in sexual behavior, see T.W. Smith, 1991, reference 3.

demography of sexual behavior, including the number of sexual partners, the prevalence of sexual abstinence, infidelity among married couples, gender preference in sexual partners, and frequency of sexual intercourse. After considering how each of these types of behavior differs across subgroups in the population, we will use the information on sexual behavior to characterize the prevalence of relatively safe or relatively unsafe sexual activity, concerning STDs in general and AIDS in particular.

Sexual Behavior

• *Number of sexual partners.* On average, adult Americans had 1.16 sexual partners during the year preceding the survey (Table 1). Men reported considerably more partners than did women, but an analysis of these reports suggests that most of this difference is probably the result of a combination of male overreporting and female underreporting. The male-female difference occurs entirely among those not currently married.¹⁷

The number of sexual partners in one year also varies considerably by marital status. The widowed reported the fewest partners (a mean of 0.21), followed by the currently married (0.96), the divorced (1.31), the never-married (1.84) and the separated (2.41). There is a fairly regular decline in the number of partners by age, from 1.76 partners among those under 30 to 0.35 among those older than 70. The number of sexual partners does not vary significantly by race, education or region of residence. People living in metropolitan areas have slightly more partners, on average, but this relationship is not strong. A multivariate regression analysis indicates that gender, age, marital status and community type are all independent predictors of the number of sexual partners.

• *Sexual abstinence.* About 22 percent of adult Americans had no sexual partners during the year preceding the survey (Table 1). This number might seem high, but two surveys and two ways of measuring sexual abstinence have produced the same estimate.¹⁸ Abstinence was more prevalent among women than among men, and abstinence was lowest among the currently married (nine percent), intermediate among the never-married, separated and divorced (20–26 percent) and highest among the widowed (86 percent).

The relationship between age and abstinence is curvilinear, starting at 13 percent among those younger than 30, falling to seven percent among those aged 30–39 and rising steadily to 68 percent among those

Table 1. Various measures of sexual behavior, by social and demographic characteristics, 1989

Characteristic	Mean no. of partners in past year (N=1,401)	% abstinent in past year (N=1,401)	Mean no. of partners since age 18 (N=1,398)	% with partner other than spouse in past year (N=761)	% exclusively heterosexual in past year (N=1,059)	No. of times had intercourse in past year (N=1,361)
All	1.16	22.1	7.15	1.5	98.4	57.4
Gender						
Men	1.49***	14.1***	12.26***	2.1	98.4	66.4***
Women	0.91	28.0	3.32	0.8	98.4	50.6
Marital status						
Married	0.96***	9.2***	5.72***	na	99.7***	67.3***
Widowed	0.21	85.9	3.01	na	100.0	5.7
Divorced	1.31	25.9	13.30	na	98.3	55.2
Separated	2.41	20.0	11.75	na	100.0	66.1
Never married	1.84	24.6	8.67	na	93.6	54.9
Age						
18–29	1.76***	12.9***	6.08*	1.0***	97.4	77.8***
30–39	1.25	7.3	8.38	0.0	98.3	78.3
40–49	1.27	10.3	9.71	1.2	99.5	66.9
50–59	0.97	21.4	9.28	1.8	97.7	46.1
60–69	0.68	40.4	4.65	4.5	99.0	22.6
≥70	0.35	68.1	3.51	1.4	100.0	8.2
Race						
White	1.11	22.3	7.30	1.3**	98.4	66.0
Black	1.64	21.6	5.84	5.3	99.1	68.2
Other	1.08	18.2	7.18	0.0	97.5	63.1
Education						
<High school	1.07	37.5***	4.59	4.0*	98.3	45.6*
High school	1.20	20.3	7.50	0.9	98.6	60.6
Jr. college	1.13	11.4	6.84	0.0	98.7	66.8
College	1.19	14.2	8.40	1.0	98.0	64.2
Postgraduate	1.02	13.3	10.54	1.8	97.4	50.5
Region						
New England	1.07	27.6	7.48	0.0	98.2	60.2*
Mid-Atlantic	1.12	22.8	5.48	2.0	99.3	57.0
Northeast Central	1.26	18.3	6.47	3.2	98.9	55.3
Northwest Central	1.04	24.8	5.88	1.2	98.9	55.1
South Atlantic	1.15	22.5	6.81	0.8	96.4	51.8
Southeast Central	1.23	21.2	5.25	0.0	97.5	51.6
Southwest Central	1.12	20.4	10.97	3.0	100.0	77.4
Mountain	0.76	29.8	6.07	0.0	100.0	43.5
Pacific	1.36	19.4	10.01	1.0	98.1	65.4
Community type						
Large central city	1.37*	25.3*	7.98**	0.0*	98.5	50.5
Other central city	1.70	25.9	11.37	0.0	97.1	53.5
Large suburban city	1.98	17.6	5.94	5.6	99.1	67.1
Other suburban city	1.15	17.6	9.72	1.7	97.8	62.2
Other urban	1.06	22.7	5.96	0.6	98.6	56.8
Rural	0.95	23.4	3.84	2.3	99.3	53.5

Note: In this and in subsequent tables, statistical significance is indicated as follows: *= $p < .05$; **= $p < .001$; ***= $p < .0001$. For these and other bivariate comparisons, the tests of statistical significance for means (e.g., mean number of partners) employ one-way analysis of variance, while for categories (e.g., percentage abstinent), chi-square tests were utilized.

aged 70 and older. Abstinence is higher among the less educated, but is not related to race or region, and has only a weak association with community type. A multivariate regression analysis indicates that

gender, age, marital status and education are independent predictors of sexual abstinence, but that type of community does not make a statistically significant independent contribution.

Table 2. Percentage distribution of U.S. adults, by sexual orientation, according to various estimations (N=1,401)

Sexual orientation	Unadjusted data	Adjusted data	
		Same ratios†	Profile‡
Heterosexual	79.6	90.9	91.6
Bisexual/homosexual	5.5	6.3	5.5
Bisexual	4.9	5.6	4.9
Homosexual	0.6	0.7	0.6
Not sexually experienced	2.9	2.9	2.9
Unclear response	11.9	na	na
Straight/bisexual§	6.7	na	na
Nonvirgin††	5.1	na	na
Missing data	0.1	na	na
Total	100.0	100.0	100.0

†The same-ratio approach assigns uncertain cases according to the ratios observed in unadjusted data.

‡The profile approach assigns uncertain cases based on the demographic and attitudinal profile or pattern of known cases.

§Respondents in this category reported having had at least one opposite-sex partner, but gave no answer to the question on same-sex partners. Depending on missing data, these would be either heterosexual or bisexual.

††Nonvirgin respondents are those who reported being married or having had children, but did not give information on their number of sex partners since age 18.

• *Number of sexual partners since age 18.* Adults reported an average of 7.15 sexual partners since age 18 (Table 1). Again, men reported considerably more partners than did women (12.3 vs. 3.3), and most of this difference appears to result from differential misreporting.¹⁹ The fewest adult lifetime partners were reported by the widowed (3.0), followed by the currently married (5.7), the never-married (8.7), the separated (11.8) and the divorced (13.3).

The respondents' number of lifetime sexual partners has a complex association with age, increasing from 6.1 among those younger than 30 to 9.7 among those aged 40–49 and falling to 3.5 among those older than 70. Since this is a cumulative measure, one would normally expect a steady increase with age, as the number of years of opportunity lengthens, or perhaps a rise followed by a leveling off at an age at which few additional partners are accumulated. The increase through age 49 may reflect this process, while the respondents over age 50 probably have actually had fewer sexual partners than younger people. With the number of partners increasing across cohorts (as one moves from older to younger ages) and across years lived since turning 18 (from younger to older ages), the net result is the curvilinear relationship shown by age in Table 1.^{*} This pattern is more pronounced among those not currently married and among men (not shown); among currently married women,

the number of adult lifetime partners does not differ across age-groups.

People living in central cities reported having had more sexual partners than did those in rural areas, although the highest number is not associated with the largest cities. The number of adult sexual partners is unrelated to race, education or region.

• *Marital fidelity.* Faithfulness within marriage is a widely shared norm: About three-fourths of Americans consider sexual relations with someone other than one's spouse always wrong.²⁰ Despite much talk about open marriages and "swinging" and despite the arguments made in popular and pseudoscientific studies that infidelity is normal,²¹ Americans in fact seem to remain fairly faithful to their spouses.²² Just 1.5 percent of married people reported having had a sexual partner other than their spouse in the year before the survey (see fourth column of Table 1). Men and women did not differ significantly in their levels of infidelity. The likelihood of infidelity in the preceding year does seem to increase with age (and, presumably, with the age of the marriage). Infidelity is higher among blacks than among whites or respondents of other races; it also tends to be more common among the less educated and in large suburbs, although these relationships are weak. Infidelity does not vary significantly by region.

Although we do not have any precise information on how many people are faithful across the life of their marriage, we can use the information on the number of partners since age 18 to calculate what proportion have reported no more sexual partners than marital partners since age 18. Respondents with the same number of sexual partners as spouses may or may not have had sexual intercourse with future marital partners before marriage or between marriages. Furthermore, those respondents who have had more sexual partners than marital partners may have always been faithful within marriage, since their extra partners may have been before or between marriage. A comparison of numbers of marital partners and sexual partners will serve as a minimum estimate of the proportion of people who have been faithful throughout married life.

Overall, 48 percent of married adults reported no more sexual partners than marital partners. More women (65 percent) than men (30 percent) reported no extra partners. Misreporting probably exaggerates the gender difference, however. Except for a slight drop between those younger than 30 and those in their 30s, the proportion of respondents with the mini-

mum number of sexual partners rises with age. As in the discussion about sexual partners since age 18, the rise with age in this percentage is probably a cohort effect. There is little or no association between the proportion with no more sexual partners than marital partners and race, education, region or type of community.

Sexual Orientation

Given the concentration of AIDS among male homosexuals, information on the sexual orientation of Americans is especially important. Our results show that 98.4 percent of sexually active adults reported that they were exclusively heterosexual during the year preceding the survey (Table 1).[†] This percentage is substantially higher than the commonly cited level of 90 percent, but concurs with the best available estimates.²³

According to the 1989 data, there were no gender differences in sexual orientation, although comparable data from 1988 had shown more male homosexuals than female homosexuals. (Given the small numbers of homosexuals and bisexuals identified in this sample, these and other estimates are subject to considerable sampling error.) Marital status is the only background variable that is significantly related to sexual orientation: Heterosexuals are concentrated among the ever-married, while bisexuals and homosexuals are concentrated among the never-married.

A breakdown of data on sexual orientation since age 18 is shown in Table 2: Only three percent of respondents reported that they had had no sexual partners since age 18, and a number of these were people in their late teens who had been sexually involved in the last year but not since turning 18. Information on the number of sexual partners was missing for 12 percent, so we cannot be certain of their sexual orientation: One group (almost seven percent of the total) mentioned partners of the opposite sex, but did not give an answer about the number of partners of the same sex; a second group (five percent) reported being married or having had a child, but provided incomplete or contradictory information on sexual partners since age 18. If these uncertain groups are distributed ac-

*The interaction between cohort and age is supported by evidence from the 1970 NORC/Kinsey study, which showed an increased number of premarital partners across cohorts (see reference 1).

†Since respondents were asked only about the gender of their sexual partners, we only have information on the sexual orientation of the sexually active. In addition, this is a behavioral measure rather than a preference measure.

cording to the ratios of heterosexuals to bisexuals and homosexuals in the survey data, then 91 percent of adults can be estimated to have been exclusively heterosexual since age 18 and six percent can be classified as homosexual or bisexual (column two of Table 2).

An examination of the demographic and attitudinal profiles of groups classified as uncertain, however, showed them to resemble heterosexuals much more than homosexuals and bisexuals. In addition, a close inspection of the survey instruments provided by those who answered the opposite-sex but not the same-sex question indicated that many of those may have considered this question not applicable.* If all are classified as heterosexual, we can estimate that almost 93 percent of adults have been exclusively heterosexual and slightly more than five percent have been homosexual or bisexual. Overall, it appears that three percent have not been sexually active as adults, 91-93 percent have been exclusively heterosexual, 5-6 percent have been bisexual and less than one percent have been exclusively homosexual. Of the 76 respondents who reported having either homosexual or bisexual relationships since age 18, 16 percent were not currently sexually active, 22 percent were currently engaged in a homosexual relationship, 59 percent were in a heterosexual relationship and three percent provided incomplete information.

Frequency of Intercourse

On average, adults reported engaging in sexual intercourse 57 times in the preceding year (Table 1). Men reported more sexual activity (66 acts of intercourse) than did women (51 acts). There was no significant difference in the frequency of intercourse reported by married men and women, however. The gender difference occurred entirely among the unmarried.²⁴ As before, we suspect this difference to be caused in part by reporting error.

Sexual activity was greatest among the currently married and the separated (many of whom were probably living with their spouse for much of the last year), was somewhat lower among the never-married and divorced and was much lower among the widowed. Frequency of intercourse also declined with age, from about 78 times per annum for those younger than 40 to eight times per annum for those older than 70. This pattern is partly related to the decline in the proportion married as the population ages. However, the trend also can be seen among the currently married, whose frequency of intercourse dropped

Table 3. Percentage distribution of respondents by behavior associated with AIDS risk

Type of behavior	%
No. of sexual partners (N=1,396)	
None	21.6
1	64.9
2-4	10.7
≥5	2.4
Relationship to sexual partner† (N=1,396)	
No partner	22.2
Regular partner	64.2
Close relationship	8.4
Casual relationship	3.2
Unknown; not regular partner	2.0
Sexual preference (N=1,367)	
Male homosexual/bisexual	0.7
Other	99.3
Overall AIDS risk‡ (N=1,394)	
None	22.1
Low	61.8
Low-to-moderate	3.2
Moderate-to-high	6.1
High	5.5
Multiple high	1.3
Total	100.0

†Regular partner is defined as the respondent's spouse or regular sexual partner. Close relationship is defined as a close personal friend, neighbor, coworker, long-term acquaintance or other. Casual relationship is defined as a casual date or pick-up or a person whom the respondent paid or who paid the respondent for sex. "Unknown" represented those for whom their current sex partner was not their regular partner but who was not otherwise specified.

‡Respondents at no risk are those with no current sexual partner. Those at low risk are those with one sexual partner (either heterosexual or female homosexual) who is their regular partner. Those at low-to-moderate risk are those with one close sexual partner (either heterosexual or female homosexual) or those with 2-4 partners (either heterosexual or female homosexual) who are their regular partners. Those at moderate-to-high risk are those with 2-4 close partners (either heterosexual or female homosexual). Those at high risk are those with five or more partners, any casual partners or a male homosexual or bisexual partner. Those at multiple high risk are those with two or more high-risk types of behavior.

from 105 acts per annum among those younger than 30 to 16 acts per annum for those older than 70. Other investigators have also observed this association.²⁵

Frequency of intercourse also has a weak curvilinear association with education. The lower frequency among the least educated is a function of their higher mean age; the cause of the apparent decline among those with a postgraduate education is uncertain.† Race, region and community type have little association with frequency of sexual intercourse. A multivariate regression analysis indicates that age, marital status, education and gender all independently affect the frequency of intercourse.

AIDS-Related Sexual Behavior

Three of the types of sexual behavior measured in the GSS are related to the likelihood of contracting AIDS and most other STDs. Those who have multiple partners,

less familiar partners and male homosexual partners are at greater risk than those without these types of sexual relationships.

• **High-risk behavior in past year.** Table 3 shows the distribution of these three types of relatively high-risk behavior. We have classified as "high risk" those respondents with five or more partners, respondents who did not have a close relationship with a partner (i.e., those who paid their partner for sex or who were paid for sex, or whose partners were casual dates or pick-ups)‡ and respondents who were male homosexuals and bisexuals. According to these definitions, 2.4 percent are at high risk because they had multiple partners in the past year, 3.2 percent are at high risk because they had unfamiliar partners and 0.7 percent are at high risk because of their sexual orientation; in addition, 2.0 percent reported that they had a partner who was not their regular partner, but did not report the nature of their relationship.§ Combining these factors and eliminating overlap produces a total of 6.8 percent of respondents who are judged to be at relatively high risk of AIDS (one or more types of high-risk behavior in the past year).

As shown in Table 4 (page 106), groups whose sexual behavior in the past year puts them at relatively high risk include males, the never-married, the young, non-whites and (perhaps) people from larger metropolitan areas. Those with the least high-risk behavior are women, the widowed, the elderly, whites and people from rural areas. Region of residence is not related to risk. Respondents with less education are significantly more likely to be at no or low risk (not shown), but the educational groups do not vary in the proportion engaging in high-risk behavior. Risk is thus relatively great among the young

*In a number of cases, respondents wrote in verbatims indicating no sexual contact with members of the same sex, and a number of other respondents wrote in dashes or slashes, which probably indicated the same.

†The peak among respondents with a junior college degree is a function of these being mostly younger people. When controls were introduced, there seemed to be some signs of a curvilinear relationship between education and frequency of intercourse. However, an examination of detailed breakdowns of sexual frequency by education according to marital status and age showed that 20 of the 60 means produced were based on fewer than 10 observations; thus, no definitive understanding of the relationship between education and sexual frequency was possible.

‡Respondents with several types of sexual partners were classified according to the least familiar level of partner.

§These respondents could have been classified as at either moderate or high risk; here, they have been classified as at high risk.

Table 4. Percentage of respondents who engaged in risky sexual behavior† in the past year or since age 18, by characteristic

Characteristic	In past year (N=1,394)	Since age 18‡	
		High risk (N=1,399)	Multiple high risk (N=1,399)
All	6.8	30.5	2.9
Gender			
Men	11.8***	48.0	2.8***
Women	3.1	17.3	3.0
Marital status			
Married	1.6***	28.1	0.8***
Widowed	2.9	11.9	0.7
Divorced	9.2	48.8	3.1
Separated	10.9	40.0	1.8
Never married	21.0	33.3	10.1
Age			
18-29	14.4***	31.1	5.0***
30-39	6.1	38.4	4.3
40-49	4.1	40.9	1.2
50-59	5.2	27.2	1.2
60-69	4.5	21.3	2.2
≥70	1.3	10.6	1.3
Race			
White	6.3*	31.0	2.8*
Black	10.1	27.2	4.3
Other	10.9	25.5	1.8
Education			
<High school	6.8***	21.5	2.4
High school	6.8	32.3	2.4
Jr. college	5.6	30.3	3.4
College	8.0	34.7	4.5
Postgraduate	6.7	35.6	5.6
Region			
New England	6.6	28.0	2.7*
Mid-Atlantic	5.7	26.8	2.6
Northeast Central	4.4	32.2	1.7
Northwest Central	6.1	23.9	1.5
South Atlantic	9.2	31.2	4.9
Southeast Central	7.7	22.9	2.9
Southwest Central	8.9	38.1	1.8
Mountain	3.6	26.2	1.2
Pacific	8.0	37.8	4.5
Community type			
Large central city	10.5*	31.6	6.3*
Other central city	9.5	34.4	2.1
Large suburban city	6.4	31.5	4.9
Other suburban city	5.7	34.7	2.2
Other urban	6.5	29.9	2.7
Rural	4.8	21.7	2.1

†Respondents were deemed to have engaged in high-risk behavior if they had 25 partners or were a male homosexual or male bisexual.

‡Statistical significance refers to the association between the demographic characteristics and all categories of past risk (none, low risk, moderate risk, one high-risk activity and two high-risk activities), not just the two high-risk categories presented above.

and unattached and among minorities living in large metropolitan areas.

• *High-risk behavior since age 18.* The available information on past sexual behavior is limited. We can identify people by how many sexual partners they have had and

by whether they have been involved in exclusive male homosexual or in bisexual behavior. However, since the only data are those indicating whether respondents engaged in these activities since turning 18, we cannot tell if they engaged in risky types of behavior since AIDS became a threat (in the late 1970s).

A total of 31.2 percent of the respondents have had five or more sexual partners since turning 18, and 5.1 percent have been male homosexuals or bisexuals. Examining these two types of risk-related sexual behavior indicates that 2.9 percent are at no risk of contracting AIDS because they have had no sexual partners; 40.0 percent have had only one, heterosexual partner, and are at low risk; and 23.7 percent have had 2-4 heterosexual partners and are at moderate risk. The remaining 33.4 percent are at high risk—30.5 percent because they have had either five or more partners or a homosexual or male bisexual partner, and 2.9 percent because they have had multiple partners and at least one homosexual or male bisexual partner. Table 4 shows high-risk activity to be greater among men, the never-married, the young and middle-aged and metropolitan residents. Risk is lowest among women, the widowed, the elderly and rural residents. There is little association between high risk and race, education or region.

Discussion

The types of sexual behavior examined here (number of current and past partners, sexual abstinence, current and past sexual orientation and frequency of intercourse) and the related exposure to the risk of AIDS do not appear to be strongly influenced by either class or subculture. Variations across educational levels are small, and regional, community and racial differences are sporadic and usually modest.

Culture plays an important role in shaping sexual behavior in two other ways, however. First, marriage remains a central institution for the regulation of sexual behavior. Monogamy is both widely endorsed as a moral ideal and practiced (at least on a year-to-year basis) by the vast majority of spouses. Marital status also affects a person's number of sexual partners and the frequency of sexual intercourse. In addition, active homosexuals and bisexuals tend to have never been married.

Second, social conventions and accepted practices have changed across recent generations. The respondents' reports on their number of sexual partners over their adult lives indicate that members of earlier cohorts have had significantly fewer part-

ners than have members of more recent cohorts. This change in behavior has been accompanied by increased social acceptance of premarital sex.²⁶

Finally, frequency of sexual intercourse and number of partners decline with age, even when marital status and gender are controlled for. Although it is impossible to separate out aging and cohort effects absolutely, we believe that the decline in frequency of intercourse is largely a biological effect.²⁷ The number of partners is probably a function of both cohort and aging effects, and the same biological factors that reduce frequency of intercourse probably tend to reduce number of partners. Also, having been raised in a less permissive sexual climate, members of earlier cohorts may restrict their number of partners.

Although more detailed sexual information and larger samples are needed to fully assess the general public's exposure to AIDS and other STDs and the probable spread of these diseases, data from the 1989 GSS provide some rough preliminary estimates. On the positive side, the relatively low recorded incidence of male homosexuality suggests that the population most exposed to AIDS may be smaller than is often assumed. Similarly, high annual fidelity rates indicate that most married couples are not risking exposure by their sexual behavior. Likewise, the 22 percent who are sexually inactive are not likely to receive (or spread) AIDS via sexual behavior.

On the negative side, a sizable share of the population (6.8 percent) is still involved in relatively risky sexual behavior, such as having multiple or unfamiliar partners. Of course, this group may be taking other precautions (e.g., avoiding riskier forms of sexual intercourse and using condoms). Among the groups most exposed to risk are young, unmarried males and, perhaps, minority cultures in our larger cities.

Whether risks have changed in recent years is hard to tell. Some people (11-12 percent) report having changed to less risky sexual behavior because of AIDS,²⁸ but the time-series data needed to confirm such changes are lacking. At one extreme, both the cohort effects shown in the GSS and discussion in the general literature on the "sexual revolution"²⁹ suggest that sexual behavior grew more permissive (and thus more risky) over time. Comparisons of the 1988 and 1989 GSS, however, indicate no significant change in the number of partners or in marital fidelity in recent years. At present, though, we cannot say if sexual behavior has changed since the late 1970s and early 1980s (prior to the recognition of the AIDS danger).

Appendix: Question Wording

The supplemental questionnaire for the 1989 GSS consisted of the following introduction and seven questions on sexual behavior:

There is a great deal of concern today about the AIDS epidemic and how to deal with it. Because of the grave nature of this problem, we are going to ask you some personal questions and we need your frank and honest responses. Your answers are confidential and will be used only for statistical reports.

1. How many sexual partners have you had in the last 12 months?

2. Was one of the partners your husband or wife or regular sexual partner?

3. If you had no other partners besides your husband or wife or regular sexual partner, please go to question 4.

If you had other partners, please indicate all categories that apply to them: close personal friend; neighbor, coworker, or long-term acquaintance; casual date or pick-up; person you paid or paid you for sex; or other (please specify).

4. Have your sexual partners in the last 12 months been: exclusively male; both male and female; or exclusively female?

5. About how often did you have sex during the past 12 months—not at all; once or twice; about once a month; two or three times a month; about once a week; two or three times a week; four or more times a week?

6. Now, thinking about the time since your 18th birthday (including the past 12 months), how many female partners have you ever had sex with?

7. Now, thinking about the time since your 18th birthday (including the past 12 months), how many male partners have you ever had sex with?

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Correction

In Table 3 of "Contraceptive Practice in the United States, 1982-1988," by William D. Mosher [22:193, 1990], the N for the "Other" category in 1988 should be 741, not 76.

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Contraceptive Use at First Premarital Intercourse: United States, 1965–1988

By William D. Mosher and James W. McNally

Summary

The proportion of U.S. women who used a contraceptive method at their first premarital intercourse rose from 47 percent in 1975–1979 to 65 percent in 1983–1988. Overall, and among non-Hispanic white women, this change resulted entirely from an increase in the use of condoms by their partners. The proportion of whites who used a condom at first premarital intercourse, for example, increased from 24 percent to 45 percent. Among blacks, condom use at first intercourse increased from 24 percent to 32 percent during that period, and pill use rose from 15 percent to 23 percent. Among all women, the method most often used at first intercourse during every period in the study was the condom, followed by the pill and withdrawal.

The proportion of women using a method at first premarital intercourse varies strikingly according to individual characteristics. Among the various demographic subgroups, the proportion who use a method varies from 32 percent of Hispanic women to 68 percent of Jewish women. Whites are more likely to use a method than are blacks, and fundamentalist Protestants are less likely to use a method than are other Protestants or Catholics. The proportion using a method is higher among women

"Our findings suggest that environment does matter: Even after we controlled for several individual characteristics, some community-level characteristics had large independent effects on the proportion using [a method] at first intercourse."

whose mothers completed high school than among those whose mothers did not. In addition, the proportion rises with age at first intercourse.

Multiple logistic regression showed that the independent effects of Hispanic origin, Jewish or fundamentalist Protestant religious affiliation and the education of a woman's mother are large and significant. The results of an analysis investigating the effects of community-level variables on use at first intercourse for a subset of women suggest that the community's socioeconomic status and employment opportunities are associated with the proportion of women who use a method at first intercourse, after individual characteristics are controlled.

Introduction

Use of contraceptives at first premarital intercourse is an important indicator of early contraceptive use and thus of the risk of premarital pregnancy. For example, studies have found that adolescents who do not use contraceptives at first intercourse are four times as likely to have a premarital pregnancy as those who do use a method, and that one-fifth of all premarital first pregnancies to teenagers occur in the first month after they begin intercourse.¹ These studies suggest that effective contraceptive use must begin at first intercourse if premarital pregnancies are to be prevented.

Use at first intercourse is also important as a measure of protection from sexually transmitted diseases (STDs). The increasing number of AIDS cases and the high incidence of other STDs among sexually

active teenagers² in recent years have made the use of condoms to prevent the spread of STDs a key issue.

There have been only a few national studies of contraceptive use at first intercourse in the United States. A 1976 study found that socioeconomic status, family stability and age at first intercourse were all related to whether a woman used a method at first intercourse. That study, however, was limited to teenage women, and the data are now 15 years old.³

A recent study of a national sample of over 5,000 women aged 15–44 found wide variations in contraceptive use at first intercourse: Of the subgroups examined, Jewish women were most likely to have used a method at first intercourse and Hispanic women were least likely to have done so. Whites were more likely than blacks to have used a method at first intercourse; use was also higher among women who had lived in a two-parent home at age 14 than among those who had not. In addition, the more years of education a woman's mother had completed, the more likely it was that the woman had used a method at first intercourse.⁴ A recent logistic regression analysis of women aged 15–24 confirmed the effects of race, mother's education and parents' marital status, but also found, after controlling for other characteristics, that in fundamentalist Protestant groups, the proportions of women whose partner had used a condom at first intercourse were much lower than in other religious groups.⁵

In a 1979 study of 348 black Chicago women aged 13–19, Dennis Hogan and colleagues found that social class, career

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aspirations, parents' marital status and an index of neighborhood quality all had an effect on use of a method at first intercourse.⁶ An analysis of about 1,500 non-black women 15–20 years of age found that the level of social disintegration in the community (as measured by the crime rate, housing turnover, the unemployment rate and the proportion of women who were divorced or separated) was related to use at first intercourse, even when individual characteristics were controlled.⁷ These findings and other discussions of the literature suggest that community-level variables can affect use at first intercourse.⁸

A number of other studies have used community-level variables to explain related behavior. For example, William Julius Wilson suggested that the social problems of inner-city neighborhoods are a result of the loss of manufacturing jobs and the movement of better-off blacks out of the inner city. This removes successful middle-class role models from poor areas and reduces the chances that poor people living in these areas will conform to middle-class norms and have middle-class aspirations.⁹

Wilson calls the effects of living in an area with a large proportion of poor people "concentration effects." One of those effects is that nonmarital parenthood is more common than in affluent areas. Thus, we would expect that women living in areas of concentrated poverty and unemployment would be less likely to use contraceptives at first intercourse than those living elsewhere. His argument suggests that the effect is categorical: Until unemployment and poverty reach a certain level, there is no effect; once they reach that level, the effect is present. In this article, therefore, we will examine whether certain measures of the extent of poverty in an area are associated with contraceptive use at first intercourse.

The extent of poverty, income inequality, and segregation by race and income in the metropolitan areas of the United States varies widely. Blacks were much more likely than whites to be poor in both 1970 and 1980; between those years, the incomes of urban whites increased, while those of urban blacks shrank.¹⁰ In Chicago, which Wilson studied in detail, segregation and racial differentials in income were extremely pronounced, raising questions about whether interpretations that are based on data from that city can be generalized to other areas.¹¹ Our analysis of national data will help to answer this question.

Data and Methods

The analyses on which this article is based used data from Cycle IV of the National Survey of Family Growth (NSFG), which was conducted in 1988. Our study, which examines U.S. trends in contraceptive use at first premarital intercourse in 1965–1988, includes variables identified in previous studies as affecting use—race, Hispanic origin, Jewish or fundamentalist religious affiliation, education of mother, and living arrangements at age 14. We also include some community-level variables to determine if they had independent effects on contraceptive use at first intercourse.

The NSFG is based on a multistage probability sample. Interviews for Cycle IV were conducted with a representative sample of 8,450 women 15–44 years old—5,354 whites, 2,771 blacks and 325 of other races. The interviews, which lasted an average of 70 minutes, covered a wide range of topics related to childbearing, including contraception, infertility, marriage, divorce and use of medical services for family planning, infertility and prenatal care.¹²

Our analysis is based on the 5,886 women in the sample who had had premarital intercourse between 1965 and 1988. The large sample size permits analysis of small groups with distinctive patterns of contraceptive use, such as Jewish, Hispanic, and fundamentalist Protestant women.* Except for differences specifically designated as nonsignificant, changes described in this article as increases or decreases and comparisons in which one proportion is described as larger or smaller than another indicate differences that were found to be significant at the five percent level ($p \leq .05$) using a two-tailed z -test.

Every woman who had ever had intercourse and had used a contraceptive method was asked: "Thinking back, the very first time you ever used a method of birth control, or had intercourse with a partner who was using a method, which method on Card 10 was that?" Each woman was then shown a card listing 15 methods of contraception, in alphabetical order from condom to withdrawal.

She was then asked: "When did you (or your partner) use (first method) for the first time? Please tell me the letter on card 14 that comes closest to your answer." The woman was then shown a card containing six categories, the first of which was "the first time you had intercourse." If the woman gave this answer, she was classified as having used a method at first intercourse. If the date of her first intercourse

was January 1965 or later, and was before her first marriage, she was included in the analysis for this paper.

Findings

• *Trends.* Table 1 (page 110) shows the proportion of women who used a contraceptive method at their first premarital intercourse, by race, year of first intercourse, and the method used. The proportion using a method remained at about the same level between 1965 and 1979 (44–47 percent), but increased to 53 percent in 1980–1982 and to 65 percent in 1983–1988. (The proportions using a method for the periods between 1965 and 1982 do not differ significantly from figures reported in an earlier study based on 1982 NSFG data.¹³) When the proportions using specific methods are considered separately, it is clear that most of the increase in use is attributable to an increase in condom use that began in the early 1980s: The proportion of women whose partner used the condom at first premarital intercourse rose from about 22 percent in 1975–1979 to 42 percent in 1983–1988. Except for a small increase in pill use between 1965–1969 and 1970–1974, there were no significant changes in the proportions using the pill, withdrawal or other methods over this 23-year period.

The trends among non-Hispanic whites were similar to the overall trends: There was a large increase in condom use between 1975–1979 and 1983–1988 (from 24 percent to 45 percent), but no significant changes in use of the pill, withdrawal or other methods. Nearly all of the increase in use of any method between the late 1960s and the late 1980s (from 50 percent to 70 percent) resulted from an increase in condom use (from 25 to 45 percent), and virtually all of that increase occurred in the 1980s. Among blacks, method use rose from 36 percent in 1965–1969 to 58 percent in 1983–1988; most of that increase resulted from an increase in use of the pill—from seven percent to 23 percent—and about half of the increase occurred before 1980. The increase in condom use among blacks was smaller—from 25 percent in 1965–1969 to 32 percent in 1983–1988.

• *Differentials.* Previous studies have found that certain characteristics of women are associated with large differences in contraceptive use at first intercourse,¹⁴ and

*Fundamentalists include those affiliated with any "Pentecostal" Church, the New Apostolic Church, Churches of the Living God or the Evangelical Free Church of America, among others. Baptists and other major denominations are classified as "other Protestant" in this analysis.

Table 1. Among women aged 15-44 who had had premarital intercourse, percentage who used a method of contraception at first premarital intercourse, by method, according to race and year of first intercourse, 1988

Race and year of first intercourse	N	Any method	Pill	Condom	Withdrawal	Other
All races†						
1965-1969	996	45.8	8.6**	24.0	9.5	3.7
1970-1974	1,444	44.4	12.1	21.0	7.3	4.0
1975-1979	1,461	46.5****	12.8	22.0	7.5	4.2
1980-1982	780	53.1****	14.2	26.7****	8.4	3.8
1983-1988	1,205	65.4	12.1	41.8	8.9	2.6
Non-Hispanic white						
1965-1969	534	49.6	9.5	24.6	11.3	4.2
1970-1974	822	47.1	12.8	22.8	8.1	3.9
1975-1979	793	50.2**	13.6	23.7**	8.0	4.8
1980-1982	405	55.0****	14.5	27.7****	8.7	4.1
1983-1988	691	69.6	11.2	45.4	10.0	3.2
Non-Hispanic black						
1965-1969	394	35.6	7.1	24.7**	2.1	1.6
1970-1974	524	34.9**	10.9	17.0**	4.0	3.0
1975-1979	534	45.3**	14.6	24.3	2.5	3.8
1980-1982	302	54.2	18.9	29.2	3.4	2.6
1983-1988	384	58.0	22.8	32.4	2.9	0.9

p<.05; **p<.001.

†The group "all races" includes respondents of "other" races and whites and blacks of Hispanic origin.

Note: Significance refers to the difference between the marked category and the category below it; percentages for individual methods may not add to total for any method because of rounding.

Table 2 shows those differences among women who had first premarital intercourse between 1965 and 1988. Overall, about half of the women (51 percent) had used a method (or had intercourse with a partner who used a method) at first intercourse. Two-thirds (68 percent) of Jewish women had used a method, compared with 54 percent of other white women, 45 percent of black women, and 32 percent of Hispanic women. Much of the variation among these groups is attributable to variations in condom use, ranging from 36 percent among Jews to 19 percent among Hispanics.

Use of withdrawal varied substantially by race, with whites more likely than blacks to use this method (nine percent vs. three percent). This was true for each time period shown in Table 1. In 1983-1988, for example, blacks were less likely than whites to use withdrawal (three percent vs. 10 percent) or to use the condom (32 percent vs. 45 percent), but they were twice as likely to use the pill (23 percent vs. 11 percent). This complex pattern of differences made it necessary to conduct separate multivariate analyses for white women and black women.

As Table 2 shows, age at first intercourse is closely related to use. Only 39 percent of women who first had intercourse before age 15 used a method, compared with 56 percent of those who delayed intercourse until they were aged 19 or older. Much of this difference resulted from variations in the proportion using the pill—six percent of those who were younger than 15 at first intercourse, compared with 18 percent of those aged 19 or older. Variations in other methods by age at first intercourse were smaller and nonsignificant.

Women who were living with both parents at age 14 were somewhat more likely than those who were not to use a method at first intercourse (53 percent vs. 47 percent), in large part because a greater proportion of the partners of women in intact families used the condom (29 percent vs. 24 percent). This finding is consistent with results from other studies.¹⁵

Use of a method differed sharply by education of mother. However, about two-thirds of the difference in use between the women whose mothers had the most education and those whose mothers had the least education was between the two lowest categories (40 percent among women whose mothers had 11 or fewer years of education vs. 54 percent among those whose mothers had 12 years of schooling): The differences among the top three categories (12 years, 13-15 years, and 16 years

or more of education) were smaller. The differences by mother's education were the result of both a higher prevalence of condom use and a higher prevalence of pill use among women with better-educated mothers.

One previous analysis found that among whites, fundamentalist Protestants were much less likely than other religious groups to use condoms at first intercourse, even after several other variables were controlled.¹⁶ The data in Table 2 support that finding: Fundamentalist Protestants were less likely than other Protestants to use a condom (18 percent vs. 30 percent) or to use the pill (seven percent vs. 12 percent) at first intercourse. The differences between other Protestants and Catholics were small and not significant. Among black women, the proportions of fundamentalist and other Protestants using the condom were the same (27 percent each), but the proportions using the pill differed sharply (five percent vs. 15 percent).

Multivariate Analysis

The variables discussed in the previous section are clearly correlated with one another; to determine the independent effects of each one, we performed logistic regression analyses. After extensive preliminary analysis, we retained variables in the final equations only if they were significantly related to method use at first premarital intercourse.

Following the procedure used by Joan Kahn and colleagues,¹⁷ we estimated four sets of equations, each with a different dependent variable. For each pair of categories, we limited the sample to respondents who selected those two categories; we then used dichotomous logistic regression to predict the likelihood of choosing one or the other.* The first dependent variable was coded 1 if a woman (or her partner) used any contraceptive method at first intercourse, and 0 otherwise; all respondents were used in this model. The second dependent variable was coded 1 if a woman used the pill at first intercourse, and 0 if she used no method; those who used other methods were excluded. The third dependent variable was coded 1 if a woman's partner used a condom, and 0 if the couple did not use a method; those who used other methods were excluded. The fourth was coded 1 if a woman's partner used a condom, and 0 if a woman used the pill; all others were excluded. These exclusions, of course, reduced the sample size in the last three equations.

The tabulations in Tables 1 and 2 and the regression results shown in Table 3

*Although the ideal way to do this would be to use polytomous logistic regression (see: reference 5), dichotomous logistic regression can be used to approximate the polytomous model.

(page 112) show that race interacts strongly with some of the independent variables. We therefore decided not to show regression equations for all races combined because the effects of race would be strongly confounded with the other variables.

In each equation, all the variables entered were dichotomous and coded as 1 if the characteristic was present and 0 if it was absent. Year of first intercourse was entered as two variables—1965–1969 and 1980–1988—with 1970–1979 as the reference category, based on our finding that the proportion of women using any method changed little during the 1970s, but increased sharply in the 1980s. The logistic regressions were run unweighted. (Experience suggests that using weights—dividing the weight by the average weight—makes little difference in the significance of results.)

The first column of the top panel in Table 3 shows predictors of use of any method by white women. The effect of having first had intercourse in 1965–1969 was not significant; this is consistent with the findings in Table 2. The effect of living in a one-parent household at age 14 was also nonsignificant. The other variables all had strong and significant effects. Having first had intercourse in the 1980s, being Jewish, and having a mother with at least 12 years of education each increased the likelihood of use by about the same amount; the coefficient for each of those variables was about 0.5. Being Hispanic (which had the largest independent effect) or being a fundamentalist Protestant both strongly reduced the likelihood of use at first intercourse.

The sample was reduced from 3,504 in the first equation to 2,087 in the equation predicting pill use (column 2). Because of the smaller sample size, the coefficient for Jewish religious affiliation became nonsignificant, even though it was virtually unchanged (.51 vs. .50). The coefficient for having first had intercourse in the 1980s was also nonsignificant, as the increased use of any method in the 1980s was mostly the result of an increase in condom use. In this equation, Hispanic origin and fundamentalist Protestant affiliation—each of which reduced the proportion using the pill—had the strongest effects. However, having a better-educated mother also had a strong positive effect on pill use.

The third equation (column 3) predicted the likelihood of using a condom (rather than no method) at first intercourse. In this equation, having first had intercourse in the 1980s was the variable with the strongest effect, reflecting the large increase in

Table 2. Among women aged 15–44 who had had premarital intercourse in 1965–1988, percent who used a method of contraception at first premarital intercourse, by method, according to selected characteristics

	N	Any method	Pill	Condom	With-drawal	Other
Total	5,856	51.2	12.0	27.3	8.2	3.8
Race/Ethnicity/Religion†						
White						
Hispanic	259	31.8**	5.5	18.6**	6.2	1.5
Jewish	73	67.8	14.1	35.8	12.0	5.8
Other white	3,172	54.2**	12.8	28.9**	9.0**	4.0
Black	2,206	44.9	14.5	25.0	2.9	2.4
Other	176	46.5	6.6	19.4	15.6	4.9
Age at first intercourse						
≤14	667	39.1**	5.5	23.0	8.8	1.8
15–16	1,719	47.3**	7.9***	29.3	8.7	1.3
17–18	2,011	53.7	12.3****	29.5	8.0	3.9
≥19	1,489	56.0	17.8	24.2	7.8	6.1
Living arrangements at age 14						
With both parents	3,913	52.8**	11.8	28.7**	8.3	4.0
With 0 or 1 parent	1,973	47.1	12.5	23.9	8.1	2.6
Education of mother						
0–11 years	2,067	40.1****	9.2**	22.3**	6.0	2.6
12 years	2,513	54.4	12.4	27.9**	10.1	4.0
13–15 years	695	58.4	13.9	32.8	7.1	4.6
≥16 years	611	60.1	15.4	32.3	8.4	4.0
Religious affiliation						
White non-Hispanic						
Fundamentalist Protestant	127	39.0**	6.5**	17.9**	10.9	3.8
Other Protestant	1,742	55.3	12.4	30.3	9.0	3.8
Catholic	997	54.4	13.1	27.7	9.5	4.0
Black non-Hispanic						
Fundamentalist Protestant	208	36.8	5.1**	27.7	1.8	2.3
Other Protestant	1,604	46.6	15.3	26.6	2.6	2.1

p<.05; **p<.001.

†Race, ethnicity and religion are combination-coded to make multivariate analysis easier and to show the separate effects of race, Hispanic origin and religion more clearly.

Note: Significance refers to the difference between the marked category and the category below it. In addition to those shown in the table, significant differences were found between Hispanic whites and other whites in use of any method, use of the pill and use of the condom.

condom use in the 1980s. Hispanic origin, which had the second strongest effect, reduced the likelihood of condom use, even after six other variables were controlled. Being a fundamentalist Protestant or living in a one-parent household also significantly decreased the likelihood of condom use.

The equation predicting condom use instead of pill use (column 4) was the weakest as measured by the chi-square and by the size of the coefficients. Only the trend (having first had intercourse during the 1960s or the 1980s) and living in a one-parent household had significant effects on choosing the condom over the pill. The contrasts between users and nonusers of any method (column 1) were larger than the contrasts between condom users and pill users (column 4).

Because the number of black women

who are Jewish or Hispanic was very small, neither variable was used in the equations for black women (Table 3, bottom panel). As in the equations for white women, having first had intercourse in the 1980s or having a mother with 12 or more years of education raised the likelihood of contraceptive use at first intercourse, although the effect of mother's education was weaker among blacks than among whites. The effect of living in a one-parent household was large and significant among blacks.

The second equation in the bottom panel of Table 3 shows that black women who first had intercourse during the 1980s were much more likely to have used the pill than those who first had intercourse during the 1970s. Being a fundamentalist Protestant strongly reduced the likelihood of pill use among black women, even when

Table 3. Logistic regression coefficients (and odds ratios), by race and characteristics related to contraceptive use at first premarital intercourse, according to method used

Characteristic	Any method vs. none	Pill vs. none	Condom vs. none	Condom vs. pill
Whites	(N=3,504)	(N=2,087)	(N=2,585)	(N=1,348)
Year of first intercourse				
1965-1969	.066 (1.07)	-.377**	.238	.585**
1980-1988	.553 (1.74)****	.209	.806****	.608****
Hispanic	-.709 (0.49)****	-.939****	-.647****	.392
Jewish	.511 (1.67)**	.500	.455	.103
Fundamentalist Protestant	-.378 (0.69)**	-.729**	-.479**	.255
Education of mother				
≥12 years	.511 (1.67)****	.602****	.428****	-.202
1 or both parents absent at age 14	-.150 (0.86)	-.036	-.266**	-.286**
Constant	-.397	-1.758	-1.137	.654
Chi-square	156	58	136	32
df	7	7	7	7
Blacks	(N=2,206)	(N=1,578)	(N=1,767)	(N=783)
Year of first intercourse				
1965-1969	-.158 (0.85)	-.861**	.237	1.087****
1980-1988	.622 (1.86)****	.765****	.750****	.005
Fundamentalist Protestant	-.355 (0.70)**	-.937**	-.020	.904**
Education of mother				
≥12 years	.188 (1.21)**	.357**	.008	-.297
1 or both parents absent at age 14	-.470 (0.63)****	-.307**	-.577****	-.207
Constant	-.375	-1.662	-1.019	.579
Chi-square	89	83	64	33
df	5	5	5	5

p<.05; **p<.001.

Note: All variables were dichotomous and entered in the equation as 1 if the characteristic was present and 0 if not. For year of first intercourse, 1970-1979 was the reference category.

the other variables were controlled. Use of the condom rather than no method (column 3) was predicted mainly by when a black woman first had intercourse and by her living arrangements at age 14. In sharp contrast to the results of the model for pill use, fundamentalist Protestant religion and education of mother had virtually no effect on condom use among blacks. In the equation predicting condom use instead of pill use (column 4), being a fundamentalist Protestant and having first had intercourse in 1965-1969 were the only variables that had a significant effect.

Table 4 shows, by race, the probabilities of using any method at first intercourse, if only one variable at a time is changed and if the baseline values are for a woman whose characteristics are about average, statistically: She first had intercourse in

the 1970s; is not Hispanic, Jewish or fundamentalist Protestant; lived with both parents at age 14; and her mother had at least 12 years of education. For white women with these baseline characteristics, the probability of using a method was 53 percent. If we change the time of first intercourse to 1965-1969 but leave all the other characteristics the same, the effect is virtually nil; the probability is 54 percent. If, however, we change the time of first intercourse to the 1980s, the probability of use rises sharply, to 66 percent. If we change ethnicity from non-Hispanic to Hispanic and leave all other variables unchanged, the probability of use drops 17 percentage points, from 53 percent to 36 percent, the largest effect of any variable in this equation. If religious affiliation is changed to Jewish, the probability increases from 53 percent to 65 percent; if it is changed to fundamentalist Protestant, the probability drops from 53 percent to 43 percent. If education of mother changes from 12 years to less than 12 years, the probability of use drops from 53 percent to 40 percent.

The effects of several of the independent variables differed by race. Among whites, being Hispanic or Jewish had a marked effect on use, but the effect of either characteristic among blacks could not be analyzed because of inadequate numbers. The effect of education of mother was smaller among blacks (four percentage points) than among whites (13 percentage points). Having lived in a one-parent household at age 14 reduced the probability of method use by four percentage points among whites and by 11 percentage points among blacks.

Community-Level Variables

If Wilson's theories,¹⁸ which were discussed earlier, are correct, we would expect that women living in areas with high proportions of male unemployment, welfare dependence and single-parent families would be less likely to use a method at first intercourse than would women with identical characteristics living in areas with higher socioeconomic status. In contrast, some microeconomic models assume that people base their decisions only on their own individual interests, and therefore predict that living in poor areas should have no effect on use.¹⁹ The conceptual, theoretical and statistical issues involved in testing these hypotheses are formidable and have been described in two excellent reviews of the problem.²⁰ At least six issues are involved.

First, how is the neighborhood, or community, defined? What are its boundaries? If it is defined statistically, how closely does it correspond to the area as defined by actual social interaction?²¹ The areas used here, which are derived from census data, are defined statistically and administratively. Although they should enable measurement of gross differences in social environments, they are not likely to be perfect proxies for the social units that affect use at first intercourse.

We used minor civil divisions—county subdivisions including townships, towns (in New England) and other units—because they should provide better measures than states or counties of differences in environment.* We did not use census tracts because we could not determine the tract of residence for about 30 percent of the women, and because census tracts might be more affected by the changes occurring between 1980, the year of reference for the community-level characteristics, and 1988, when the individual-level data were collected. Equations run for the 70 percent of the cases that could be located by census tract, however, yielded

*Examples of minor civil divisions include the boroughs of New York City (such as Queens, Manhattan, and the Bronx), the parts of Washington, D.C. (such as Northwest Washington and Southeast Washington), and townships in New England (such as New Haven, Connecticut).

results similar to those shown here for minor civil divisions.

To determine the characteristics of the minor civil divisions, we used a community-level data set derived from the Health Demographic Profile System developed by the National Institute of Mental Health. This data set contains many summary measures based on 1980 census data for states, counties, minor civil divisions and census tracts. For this analysis, we added some characteristics of the area in which each woman lived—including the proportion of households with income below the poverty level, the proportion of households on public assistance, the male unemployment rate and proportion of residents who were Hispanic—to our file of the woman's individual characteristics. In short, our measures of the characteristics of the "community" are imperfect measures of the social units that may affect use at first intercourse, but data to measure the latter are not available.

The second issue concerns the measurement of community-level characteristics. Should the measures of community characteristics be expressed as averages of continuous variables, or as categories? If categories are used, what should the cut-off points be? According to the theory and research of Wilson and of Hogan and colleagues, an environment of poverty requires a certain level of the independent variables to have its effect on behavior; until that level is reached, there is little or no effect.²² This suggests a categorical, not a continuous, variable. In the absence of adequate theory on appropriate cut-off points, we determined the categories through extensive preliminary cross-tabulations of these and other community-level variables. Our cross-tabulations suggested that these variables and these dichotomous cut-off points affected the proportion of women who used a method, and yielded enough cases in each category to give reliable results: Ten percent or more of households with income below the poverty level; at least 10 percent of households on public assistance; a male unemployment rate of five percent or higher; and 10 percent or more Hispanics in the population. Clearly, it would have been desirable to use higher cut-off points to measure more extreme ghetto conditions, but the sample size was too small for us to do so.

The third issue involves selection effects. If enough people enter or leave a community, the community changes. If community-level variables show effects, are those effects of the environment of that community, or are they artifacts of the kinds of

Table 4. Probabilities of using any method at first intercourse, by variable and race

Variable	White	Black
Baseline†	.53	.45
Baseline except:		
First intercourse 1965–1969	.54	.41
First intercourse 1980–1988	.66	.61
Hispanic	.36	na
Jewish	.65	na
Fundamentalist	.43	.37
Mother did not complete		
high school	.40	.41
One or both parents absent	.49	.34

†Woman had first intercourse in 1970–1979, is not Hispanic, Jewish or fundamentalist, and lived with both parents when she was 14; her mother had at least 12 years of education.

Note: na=not applicable.

people who move into and remain in that community? One side of this debate contends, as we do, that controlling for the individual-level characteristics of the women eliminates the threat of selection bias;²³ the other side contends that not even individual-level controls are adequate, but proposes no clear solution.²⁴ The distinction is important, because if the effect is a result of the community environment, policies should be directed at changing the neighborhood, but if the effect is one of selection, policies should be aimed at individuals.²⁵

Fourth, how long must a person be exposed to an environment to be affected by it?²⁶ Ideally, we should have measures of how long a woman has been living in the area under study. However, the 1988 NSFG did not collect residence histories and did not ask how long respondents had lived in the minor civil divisions where they were living at the date of interview. The survey did include two questions on mobility: "How long have you lived at this address?" and "How long have you lived in this state?" Excluding all women who have changed addresses since their first intercourse leaves a small, very young, highly biased sample and omits many women who moved locally. Excluding women who have moved into an area from a different state since first intercourse also results in an imperfect measure; it omits some women who came from grossly different environments, but it does not tell us the environments from which they came.

We defined three residential populations for the analyses. Each balanced considerations of sample size, sample homogeneity and exposure to community-level variables in different ways. The first population is women who had first premarital intercourse in 1975–1988 and lived in the

same state between first intercourse and interview. The second includes all women who first had intercourse in 1975–1988, regardless of their residence history. This approach increases the sample size substantially, although some of the additional women will not have been exposed to the community-level variables in the area in which they currently live. The third group consists of all women who had first intercourse in 1980–1988. This definition has the theoretical advantage of ensuring that the year to which the community-level variables refer precedes the first intercourse, thus removing one obstacle to making causal inferences; on the other hand, it substantially reduces the sample size. In short, residence history data might have given us a better way to measure exposure to the community-level variables, but our three approximations yielded similar results, which increases our confidence in the validity of our findings.

The fifth issue concerns how the community-level variables should be modeled statistically. Two basic approaches have been used in research to date: ordinary regression or logistic regression, and hierarchical linear modeling. Much of the research using hierarchical linear models has focused on how the characteristics of schools affect the academic achievement of individual students,²⁷ but some studies have examined fertility and contraceptive use in developing countries.²⁸ We worked with logistic regression in this analysis, because software for hierarchical linear modeling was not available to us.* Moreover, there was no clear evidence suggesting that the latter approach would be superior in this case.

The sixth issue concerns how the multivariate models should be specified. The effects of community-level variables could be nonlinear, so we did preliminary analyses to check for nonlinearity and used categorical variables. There was interaction between race and the community-level variables, so we ran our models separately for whites and blacks. We could have tested for interactions between individual characteristics (other than race) and the

*Hierarchical linear models use special computer software that is not available in standard software products such as SPSS or SAS; in fact, the software for categorical dependent variables (which we use in this paper) is available only on the University of Michigan computer (B. Entwistle, personal communication). In addition, the output from these procedures is extremely complex and difficult to interpret, but if certain simplifying assumptions are made, these models reduce to standard regression models. (See: S. W. Raudenbush and A. S. Bryk, 1986, reference 27.)

Table 5. Logistic regression coefficients for use of any contraceptive method at first premarital intercourse, by race and individual and community characteristics, according to year of first intercourse

Characteristic	Intercourse 1975-1988, same state†	Intercourse 1975-1988	Intercourse 1980-1988
WHITES	(N=928)	(N=1,201)	(N=719)
Individual			
Year of first intercourse			
1980-1988	.375**	.482****	na
Hispanic	-.486*	-.566**	-.475
Education of mother			
≥12 years	.649****	.689****	.611***
1 or both parents			
absent at age 14	-.143	-.202	.120
Community			
Poverty rate ≥10%	.066	.109	.126
Public assistance ≥10%	-.039	-.051	-.284
Male unemployment ≥5%	-.427**	-.337**	-.467**
Hispanic ≥10%	-.414**	-.340**	-.436**
Constant	.137	-.142	.542
Chi-square	54	74	38
df	8	8	7
BLACKS	(N=658)	(N=794)	(N=445)
Individual			
Year of first intercourse			
1980-1988	.542**	.529***	na
Education of mother			
≥12 years	.303*	.296**	.364*
1 or both parents			
absent at age 14	-.313*	-.391**	-.300
Community			
Poverty rate ≥10%	.055	.009	.025
Public assistance ≥10%	-.499**	-.463**	-.501**
Male unemployment ≥5%	.075	.013	-.033
Hispanic ≥10%	-.084	-.041	-.285
Constant	-.151	-.065	.539
Chi-square	27	33	14
df	7	7	6

*p≤.10; **p≤.05; ***p≤.01; ****p≤.001.

†This sample was restricted to women who lived in the same state at first premarital intercourse and at interview.

Note: na=not applicable.

community-level variables; these are difficult to interpret. The community-level variables are probably correlated with each other, so we could have used an index of "neighborhood quality," as Hogan and colleagues did, to guard against unstable estimates. Such indexes are difficult to interpret because they do not reveal which variable in the index is having the primary effect, so we chose to use a small number of community-level variables instead. Each of these choices leaves room for other researchers to make different decisions as they undertake similar studies.

The top panel of Table 5 shows the results among white women of the three logistic regression analyses by population

group. In each case, the dependent variable was use of any method vs. use of no method at first premarital intercourse. We did this for two reasons: First, use of any method was the most general and most important dependent variable; second, it allowed us to use the whole sample. The first equation included the 928 white women who first had intercourse in 1975-1988 and lived in the same state thereafter; the second included all 1,201 white women who had intercourse after 1975, regardless of residence; and the third included only the 719 white women who had first intercourse after 1980.

In the first two equations, having first intercourse in the 1980s had a strong posi-

tive effect on contraceptive use, as we saw in the individual-level models. In all three equations, the effect of being Hispanic was substantial, although it was not significant in the analysis using the most restricted sample (column 3). In all three equations, having a mother with at least a high school education had a strong positive effect on use. Having lived in a one-parent household at age 14 did not have a significant effect in any of the equations for whites.

More interesting, however, are the results for the community-level variables. The coefficients for both the male unemployment rate and the proportion of Hispanic residents are negative and significant in all three equations. Furthermore, the size of the coefficients in the three equations is similar. This means that if a white woman lived in an area with a male unemployment rate of five percent or more in 1980, she is less likely to have used a method at first intercourse, after her individual characteristics are controlled. Similarly, if the area in which she lived had a population that was at least 10 percent Hispanic, she is less likely to have used a method, regardless of whether she herself is Hispanic.

The results among black women are shown in the bottom panel of Table 5. Again, the dependent variable was whether the woman (or her partner) used any contraceptive method the first time she had intercourse. The effect of having first intercourse in the 1980s was large and positive, as in the equations for whites. But there were some noteworthy differences. The effect of having a mother with at least 12 years of education was positive and significant, although it was weaker than in the equations for whites. The effect of having lived in a one-parent household was significant in two of the three equations, and was nearly significant in the third.

The analyses using the community-level variables also produced different results for blacks than for whites. If 10 percent or more of households in her area were receiving public assistance, a black woman was considerably less likely to have used a method at first intercourse. However, neither the male unemployment rate nor the proportion of Hispanics in the community had a significant effect.

It is easier to understand the practical effect of logistic regression coefficients when they are transformed into predicted probabilities. The probabilities in Table 6 were derived from the coefficients in the first column of Table 5. The characteristics of the hypothetical "average" woman in

this table are similar to those of the woman described in Table 4: She first had intercourse in 1975-1979, is not Hispanic, and lived with both parents when she was 14; her mother is a high school graduate. In Table 6, however, we also include the community-level characteristics of the average woman: She lives in an area of low unemployment, with a small Hispanic population and low proportions in poverty and on public assistance.

For a white woman with these "average" characteristics, the probability of method use at first intercourse was 69 percent. Her living arrangements at age 14 and the community poverty rate and public assistance rate had little effect on her probability of use. If she was Hispanic, her probability of use dropped from 69 percent to 57 percent, even after controlling for the other seven variables. If her mother did not complete high school, the probability dropped from 69 percent to 53 percent. If this otherwise average woman lived in an area that had a high unemployment rate, her probability of use dropped by 10 percentage points (from 69 percent to 59 percent). Living in an area with a high proportion of Hispanic residents would also lower her probability of use by 10 percentage points.

For a black woman with the same baseline characteristics, the probability of method use at first intercourse was 54 percent, 15 percentage points lower than the baseline probability for a white woman with the same characteristics. With other variables controlled, having lived in a one-parent household at age 14 reduced the probability that she used a method from 54 percent to 46 percent, an effect stronger than that for her white counterpart. If her mother did not finish high school, her probability of use decreased to 46 percent, but this effect was only half as large as the effect of that variable on a white woman with the same characteristics. As for the community-level variables, the effects of the poverty rate, male unemployment rate and proportion of Hispanic residents were all negligible. However, if a black woman lived in an area with a high proportion of residents receiving public assistance, her likelihood of use dropped from 54 percent to 41 percent, an independent effect of 13 percentage points.

In short, some of the community-level variables had large independent effects on use of contraceptives at first intercourse, but the characteristics having an effect were not the same for whites (unemployment and percent Hispanic) as for blacks (percent on public assistance). These ef-

Table 6. Probabilities of using any contraceptive method at first intercourse, by variable and race

Variable	White	Black
Baseline†	.69	.54
Baseline except:		
First intercourse in 1980s	.76	.67
One or both parents absent at age 14	.66	.46
Hispanic	.57	na
Mother did not complete high school	.53	.46
Percent on public assistance		
≥10% in 1980	.68	.41
Unemployment rate		
≥5% in 1980	.59	.56
Percent Hispanic		
≥10% in 1980	.59	.52
Poverty rate		
≥10% in 1980	.70	.55

†Woman had first intercourse in 1975-1979, is not Hispanic and lived with both parents when she was 14; her mother had 12 or more years of education. The woman lives in an area with a male unemployment rate of less than five percent, a population that is less than 10 percent Hispanic and of which fewer than 10 percent live in poverty or on public assistance.

Notes: This table uses the population from the first column in Table 5, i.e., women who had first intercourse in 1975-1988 and lived in the same state at first intercourse and at interview; na=not applicable.

fects provided some support for theories about the effects of concentrated urban poverty,²⁹ but the unresolved conceptual and methodological issues in community-level analysis caution against drawing sweeping conclusions from these results.

Discussion and Conclusions

This study has four important strengths. First, these are the most recent national estimates of contraceptive use at first intercourse in the United States. Second, the large sample size permits the study of small groups such as Hispanic women, Jewish women, and fundamentalist Protestant women, who have patterns of use distinctly different from those of most other women. Third, the wide age range allows us to study trends from 1965 through 1988. Last, our analysis of the community-level data allowed us to examine the effects of those variables combined with individual level data.

In a decade in which HIV infection has become a major concern, and in light of the high rates of STD infection among sexually experienced teenagers,³⁰ the large increase in the 1980s in the proportion of whites using a condom at first intercourse is an important finding. However, the finding that the proportion using a condom at first intercourse in 1983-1988 was still much lower among blacks than among whites is noteworthy, because blacks are

at higher risk than whites of sexually transmitted infections, including HIV.³¹

Our analyses of differentials support many of the findings of earlier studies, while also breaking new ground. An earlier study suggested that further progress might be made by linking data at the psychosocial and community levels with individual-level data such as these.³² We have been able to use community-level data for a subset of these women, but some of the most distinctive groups (including Jewish women and fundamentalist Protestant women) had to be excluded from the community-level analysis because of inadequate numbers. However, some previous studies have not had enough respondents to study these groups at all.³³

The type of household in which the respondent lived at age 14 emerged as an important predictor of contraceptive use at first intercourse for blacks, but not for whites. Apparently this variable is largely a proxy for socioeconomic effects among whites. Socioeconomic effects are important: Education of mother is a strong predictor of use for both races, especially for whites. The mother's level of education represents the socioeconomic level of the family; it may also tap the aspirations of the young woman for what Hogan and Evelyn Kitagawa called a "path to adulthood," in which childbearing is delayed until after a woman's education is completed and she obtains a good job. If the woman sees those goals as the only acceptable way to attain adult status, early parenthood becomes unacceptable and contraceptive use during premarital intercourse is more likely.³⁴

Our analysis of the community-level data should be regarded as preliminary. Until the conceptual and methodological issues we discussed in this article have been resolved, it would be premature to base policy recommendations on these results. But our findings suggest that environment does matter: Even after we controlled for several individual characteristics, some community-level characteristics had large independent effects on the proportion using contraceptives at first intercourse.

These findings are generally consistent with theories that living in an economically depressed area discourages the planning and deferral of gratification that use of contraceptives at first intercourse requires.³⁵ However, they do not settle the issue of how community-level variables produce their effects. If an effect results from living in a community, and not from selection bias, how do we interpret it? Is the

community effect a result of learning through imitation ("contagion model"), of learning norms (socialization), of transmission through institutions such as churches and schools, or of social comparison processes through reference groups?³⁶ We cannot answer these questions definitively. We simply suggest that the issue is worth exploring because we have found significant effects. The policy implications of our findings suggest that further research on such community-level effects is a high priority, despite the considerable problems inherent in such efforts.³⁷

Future research should include better measures of the residence history of respondents, which would help to locate the community characteristics that affected them. It might also include direct measures of such psychosocial variables as communication with peers and partners, female power in the relationship, and male and female career aspirations.³⁸ Having direct measures of these variables would allow us to establish how they are related to the individual characteristics studied here (such as education of mother, religious affiliation, race and ethnicity), and to the characteristics of the communities in which women live. Such an understanding might suggest intervention strategies

effective in preventing both unintended premarital pregnancy and infection with sexually transmitted diseases.

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Substance Use and Prenatal Care During Pregnancy Among Young Women

By Joyce C. Abma and Frank L. Mott

Summary

Data on a cohort of young mothers from the National Longitudinal Survey of Youth were examined for use of alcohol, cigarettes and marijuana during pregnancies leading to first births. A substantial proportion of women (45 percent) were found to have used at least one of these substances. White women were more likely to use a substance during pregnancy than were Hispanic or black women; women with the prospective father present in the household were less likely than other women to use a substance. Compared with well-educated and older women, less-educated and younger women were more likely to smoke cigarettes or marijuana during pregnancy, but were less likely to drink alcohol. Only about 13 percent of women used more than one substance.

Nineteen percent of the women received no prenatal care in the first trimester of pregnancy. Less-educated and younger women were least likely to receive early prenatal care. Multivariate analysis found no association between neglect of prenatal care and substance use. Rather, the analysis revealed that the two behaviors shared likely antecedents, such as whether the prospective father was in the home prior to the pregnancy.

Introduction

The detrimental effects for both mother and child of drinking liquor or smoking cigarettes or marijuana during pregnancy have been well documented.¹ Not only

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Despite efforts to inform the public about the risks to mother, fetus and child of substance use during pregnancy, large proportions of younger women use cigarettes, marijuana or alcohol during the pregnancy leading to their first birth.

could using any one of these substances during pregnancy be harmful, but there is some evidence that using more than one could have a compounding effect beyond that suggested by the independent negative consequences of each substance.²

The later adolescent and early adult years are frequently considered the ages of greatest risk for substance use and abuse. In addition, the likelihood of having unplanned, unwanted and out-of-wedlock pregnancies and births is also greatest during these ages.³ This juxtaposition of unwanted pregnancy and above average risk of substance use suggests that the dangers of substance use to both mother and child may be greatest during the late teens and early 20s.

Because pregnancies among young women are more likely to be unwanted, and because young women are less likely to have support networks and resources to obtain health care, younger mothers are typically somewhat less likely to receive adequate and early prenatal care.⁴ Women who do not obtain adequate prenatal care may also engage in other pregnancy behaviors that can be detrimental to their own well-being and their children's. One reason may be that obtaining little or no prenatal care may reflect a lesser concern by the woman about her and her child's health, and thus may be predictive of other detrimental behaviors during pregnancy. Another reason, however, may be that an expectant mother who receives prenatal care and is advised against certain behaviors is more likely to discontinue those behaviors than women who receive no prenatal care.

Using data from the National Longitudinal Survey of Youth (NLSY), we examine the probabilities that young women will smoke cigarettes or marijuana or drink alcohol during the pregnancy leading to their first birth. With a multivariate analysis, we examine whether a variety of background characteristics are associated with a woman's likelihood of using one or more of these substances.

We also present the proportions of women in this cohort who obtained early prenatal care and discuss whether there is a link between using a substance and not obtaining prenatal care during pregnancy. While causal questions remain unanswered, the research does provide important insights into the levels of substance use among young pregnant women, factors associated with substance use, and the relationship between using a substance and obtaining early prenatal care.

The Data Set

The data used in this research are from the 1979-1988 rounds of the NLSY. In 1979, 12,646 men and women aged 14-21 (as of January 1 of that year) were originally surveyed. A special supplement of about 1,200 military respondents who were interviewed annually through the 1984 survey year was included. The nonmilitary sample of about 11,400 respondents was interviewed annually from 1979 to 1988, with more than 90 percent of the original cohort still being interviewed as of 1988.⁵ Of the original 5,828 civilian women interviewed, 5,249, or about 91 percent, were still being interviewed in 1988 and more than 60 percent, or 3,336, had become mothers.

To provide a sample of minority and economically disadvantaged respondents sufficiently large for statistically meaningful racial, ethnic and socioeconomic comparisons, the NLSY oversampled black, Hispanic and economically disadvantaged white respondents. However, we weighted the sample results to make them nationally representative of mothers their age. In addition, because the information is more complete for women who became mothers during the study period, our data are limited to those who had their first birth during that 1979–1988 interval. However, because information on marijuana use during pregnancy is not available for births between the 1984 and 1986 survey rounds, our study focuses on women who had a pregnancy leading to their first birth between the 1979 and 1988 surveys, excluding the 1984–1986 period.

Table 1 describes the characteristics of the 1,664 young women who are the focus of both the descriptive and multivariate analyses. As of the 1988 interview, the women in the sample had reached ages 23–31; thus, this first-birth sample disproportionately represents younger childbearers. However, the weighted sample describes an important segment of American childbearing—perhaps typical of 50–60 percent of first births to a contemporary cross-section of young American women who had their first birth over the past decade or so.

The sample contains women of sufficiently diverse characteristics that several possible antecedents to prenatal risk behaviors can be considered. The weighted sample is 22 percent minority. It also includes a substantial proportion of women who had a first birth during adolescence (25 percent). One-quarter of the women had fewer than 12 years of education at the time of the survey immediately preceding their pregnancy; almost one-third of the

Table 1. Weighted percentages among women aged 23–31 in 1988 who had had a first birth, by selected background characteristics, 1979–1988, NLSY

Characteristic	%
Race/ethnicity	
Hispanic	7.2
Black	15.1
White/other*	77.7
Completed education†	
<12 yrs.	25.4
12 yrs.	43.8
≥13 yrs.	30.7
Enrolled in school	16.7
Age at first birth	
<20	25.2
20–22	32.3
≥23	42.4
Family situation‡	
Income‡	
<\$10,000	19.3
\$10,000–\$19,999	22.9
≥\$20,000	38.0
Child's father present	78.8
Residence‡	
Urban	78.3
Religiosity§	
Attended services ≥ monthly	58.1

*In this and subsequent tables, this category includes all nonblack, nonhispanic respondents.

†Measured as of the last survey prior to pregnancy.

‡Because of a high nonresponse rate, the percentages do not add to 100.

§Measured in 1979.

women had 13 or more years of education. Almost 17 percent were enrolled in school at that time. An estimated 24 percent had a family income of less than \$10,000, and about 47 percent had an income of at least \$20,000. Although 78 percent lived in urban areas and 79 percent were living with the father of the child before the birth, significant numbers (for the purposes of this analysis) lived in rural areas and were not living with the father of the child at the survey before their first birth.

Substance Use

Respondents to the NLSY were asked whether they had consumed liquor or smoked cigarettes* or marijuana during their pregnancy. Women were classified as having smoked cigarettes or marijuana if they said they had done so at all during the 12 months preceding the birth of the child. Women were classified as having used alcohol if they had had more than one drink per month during pregnancy.

The behaviors that are the subject of our analyses depend on retrospective self-reports and involve varying amounts of time between the actual pregnancy and the reporting of behaviors pertaining to that pregnancy.† Since the analyses are limited to births occurring in 1979 or later, and prenatal information was collected on an ongoing basis only after 1983, the interval between a pregnancy and the survey questions regarding substance use during that pregnancy varied. The majority of respondents were reporting on pregnancies that occurred shortly before the survey that provided the information. The accuracy of the marijuana information for pregnancies in 1984 and earlier, of course, depends on the accuracy of the five-year monthly schedule collected in the 1984 survey.‡

Table 2 shows the prevalence of the use of alcohol, cigarettes or marijuana during pregnancy among population subgroups. White women were much more likely than black and Hispanic women to smoke tobacco during pregnancy, a result consistent with results from other studies.⁴ Forty-one percent of white women smoked cigarettes during the pregnancy leading to their first birth, compared with 25 percent of black women and 19 percent of Hispanics. White women were also more likely to drink liquor or to smoke marijuana than were black or Hispanic women, although the latter differences were modest. Hispanic women were the least like-

*See Table 2 for the exact wording of the questions. We chose to define cigarette smoking during pregnancy as any occurrence of smoking at all both because of the limited sample sizes for the heavy-smoking subset, and to provide consistency in definition with our other measures, particularly with that of marijuana. Research on the effects of cigarette use on birth outcomes has not resolved ambiguity regarding the amount of risk associated with various degrees of smoking.

†Assessments of prenatal tobacco and alcohol use began in 1983, collected for the youngest child only. In 1984, 1985, 1986 and 1988, the information was collected for children born since the last interview. In addition, the 1986 survey asked about all pregnancies not covered by other surveys up to that point, approximately 30 percent of the total births. Marijuana use was determined from 1984 survey questions on month-

by-month marijuana use over the preceding five-year period and questions asked in the 1988 survey rounds. The 1979–1984 retrospective items were mapped against pregnancies that occurred during that interval, permitting estimates of whether marijuana was used during pregnancies in that interval. This mapping was carried out by Rosenzweig and Wolpin (1990), and the data on marijuana use during pregnancy for the 1979–1984 period was provided to us by them (see: M. Rosenzweig and K. Wolpin, "The Effects of the Timing and Frequency of Marijuana Use on Fetal Growth Based on Sibling Data," Working Paper, University of Minnesota, 1990).

‡Research on the accuracy of reports of substance use in general is pertinent to the current study, certainly in the case of marijuana information for births in 1984 and earlier, and in the case of self-reports of use during pregnancy. Research indicates that substance use is

underreported, particularly by women and minorities (see: S. Mensch and D. Kandel, "Underreporting of Substance Use in a National Longitudinal Youth Cohort: Individual and Interviewer Effects," *Public Opinion Quarterly*, 52:100, 1988.) This research suggests that underreporting is most likely to occur among the lightest users. From the perspective of the potential impact of substance use on subsequent health, this suggests that the underreporting is most likely for those cases where the health risks were smallest. Furthermore, confidence in the quality of the reporting is bolstered by comparisons of earlier reports of substance use of the NLSY respondents with other published data, which suggested that levels of use in the NLSY were roughly parallel to those from other sources (see: F. L. Mott and R. J. Haurin, "Linkages Between Sexual Activity and Alcohol and Drug Use Among American Adolescents," *Family Planning Perspectives*, 20:128, 1988.)

ly to engage in any of the risk behaviors.

Women with some college education were substantially less likely to smoke tobacco or marijuana (21 percent and six percent, respectively) than were women with 12 years of schooling (42–47 percent) or less (15–18 percent). In contrast, the least educated women—those with fewer than 12 years of schooling—were the least likely to consume alcohol during pregnancy, as other studies have shown.⁷

The associations between age at birth and use of the various substances are similar to those between education and substance use. Women aged 23 and older at first birth were less likely than those aged 22 and younger to smoke cigarettes or marijuana during pregnancy. However, those younger than 20 were less likely than those 20 or older to drink alcohol.

Tables 3 and 4 (page 120) focus on a pregnant woman's tendency to be involved with different combinations of substances during her pregnancy. Overall, a majority (55 percent) of the pregnant women indicated that they did not use any of the substances during their pregnancy (Table 3). In addition, most substance users used only one substance, primarily cigarettes. Indeed, only about 11 percent of all the women used two substances, with smoking marijuana and smoking cigarettes the most popular combination (6.3 percent); only two percent used all three substances.

White women were slightly more likely than black or Hispanic women to use more than one substance during pregnancy. About seven percent smoked both cigarettes and marijuana, for example, compared with five percent of black women. All the groups of women were unlikely to combine alcohol and marijuana, however (one percent of women did so).

The associations of multiple-substance use with education and age are more complex. Women with less education and those who were younger at the time of their first birth were the most likely to use more than one substance during pregnancy. However, women aged 20–22 and those with 12 years of schooling were more likely than women in their respective comparison groups to use all three substances. Further, the greater tendency of the less educated and youngest groups to engage in two of the risk behaviors reflects only a substantially greater likelihood of combining cigarette and marijuana smoking—10 percent of those with less than 12 years of education and 12 percent of those younger than 20 smoked cigarettes and marijuana during pregnancy. The tendencies to com-

Table 2. Percentage of first-time mothers who smoked cigarettes, drank alcohol or smoked marijuana during pregnancy, by selected background characteristics

Characteristic	N	Substance		
		Cig.*	Alcohol*	Marij.*
Total	1,664	36.7	10.5	12.9
Race/ethnicity				
Hispanic	299	18.6	3.7	9.8
Black	436	25.0	7.6	11.0
White/other	929	40.7	11.7	13.5
Education				
<12 years	545	46.9	6.5	17.9
12 years	667	41.5	12.3	15.0
≥13 years	452	21.4	11.2	5.6
Age at first birth				
<20	526	39.5	5.8	18.9
20–22	542	41.5	10.5	16.1
≥23	596	31.4	13.2	6.9

*Respondents were asked, "Did you drink any alcoholic beverages, including beer, wine, or liquor, during the 12 months before (child) was born?" A range of choices was provided for positive responses for usual frequency of drinking alcoholic beverages during that pregnancy. To assess cigarette smoking, respondents were asked, "Did you smoke tobacco cigarettes at all during the 12 months before (child) was born?" Those responding positively selected from choices of number of cigarettes smoked on average during that pregnancy. In 1988, the survey included, "Did you use marijuana or hashish at all during the 12 months before (child) was born?" Choices were provided for usual frequency of marijuana use during that pregnancy.

bine alcohol with cigarettes or marijuana do not vary a great deal by education or age, and no pattern is discernible.

Table 4 focuses only on those respondents who used at least one of the three substances. The data in this table reveal that while the majority of women who smoked cigarettes during their pregnancy did not drink liquor or smoke marijuana, the majority of those who engaged in one of the other two behaviors engaged in multiple behaviors. This pattern may be an outgrowth of the notion that marijuana and alcohol use are generally less socially

acceptable than cigarette smoking, particularly during pregnancy. As we saw earlier, however, only small proportions of young women use either alcohol or marijuana while they are pregnant.

The patterns according to race/ethnicity, education and age are similar to those found in Table 3. We again see that the younger women and those with the least education were most at risk for engaging in more than one of the behaviors during pregnancy. Almost 90 percent of the women with fewer than 12 years of education who drank alcohol, and 72 percent of those who smoked marijuana, used at least one other substance.

Prenatal Care and Substance Use

While there is an increasing awareness among women that the use of substances during pregnancy may be harmful to the fetus, and ultimately the infant, it may be that younger mothers, particularly those with less education or those living in disadvantaged circumstances, are less knowledgeable in this regard than are other women. One important mechanism for providing appropriate health care information to pregnant women is early prenatal care. Women who do not obtain prenatal care may therefore have less knowledge about appropriate behaviors than women who do obtain such care. Younger women may face a variety of obstacles in obtaining early prenatal care, including not being aware that such care is an important part of having a healthy pregnancy.

Overall, 81 percent of the mothers in our sample received prenatal care during the first trimester of their pregnancy. However, this varied somewhat by population subgroup. As other studies have shown,⁸ Hispanic women, women with fewer than 12 years of schooling and women who had

Table 3. Percentage distribution of first-time mothers who smoked or drank during pregnancy, by substance used, according to selected background characteristics

Characteristic	None	Cig. only	Alcohol only	Marij. only	Cig. & alcohol	Cig. & marij.	Alcohol & marij.	All three	Total
Total	54.7	24.7	4.0	3.8	3.7	6.3	0.7	2.0	100.0
Race/ethnicity									
Hispanic	74.8	12.9	1.8	4.8	0.7	3.8	0.0	1.2	100.0
Black	66.8	16.6	2.6	4.5	3.0	4.6	1.2	0.6	100.0
White/other	50.5	27.4	4.5	3.6	4.2	6.6	0.7	2.3	100.0
Education									
<12 years	46.6	31.6	0.8	4.9	3.1	10.3	0.8	1.8	100.0
12 years	49.5	27.2	4.3	4.0	4.0	7.0	0.7	3.3	100.0
≥13 years	68.9	15.4	6.3	2.8	3.9	1.6	0.7	0.4	100.0
Age at first birth									
<20	54.7	22.8	0.7	4.9	3.0	11.8	0.2	1.9	100.0
20–22	49.9	27.9	2.8	5.0	3.2	6.7	0.7	3.7	100.0
≥23	58.4	23.4	6.8	2.3	4.6	2.7	1.1	0.8	100.0

Table 4. Among first-time mothers who smoked or drank during pregnancy, percentage (and number) who used only one substance, by substance, according to selected background characteristics

Characteristic	Cigarettes only	Alcohol only	Marijuana only
Total	67.3 (572)	38.1 (149)	29.9 (200)
Race/ethnicity			
Hispanic	69.4 (55)	*(15)	49.0 (24)
Black	66.3 (109)	34.7 (33)	40.0 (46)
White/other	67.3 (408)	38.2 (101)	27.0 (130)
Education			
<12 years	67.5 (229)	11.7 (35)	27.6 (88)
12 years	65.6 (243)	34.7 (71)	26.5 (83)
≥13 years	71.7 (100)	56.0 (43)	49.1 (29)
Age at first birth			
<20	57.8 (195)	12.5 (29)	26.1 (82)
20-22	67.3 (205)	27.2 (56)	31.2 (82)
≥23	74.4 (172)	51.4 (64)	33.9 (36)

*Sample size is too small to calculate percentage.

their first child before age 20 were least likely to have received early prenatal care—73 percent, 71 percent and 73 percent, respectively. White women, women with 13 or more years of education and those aged 23 and older were most likely to have done so—82 percent, 87 percent and 85 percent, respectively.

From a program perspective, it is important to determine whether the lack of early prenatal care is linked with the likelihood of using a substance during pregnancy. Table 5 presents the proportions of women engaging in substance use by whether they obtained early prenatal care. The data indicate that, overall, women who received early prenatal care were slightly less likely to use any of the three substances during pregnancy. Forty-four percent of women who received care during the first trimester used at least one substance, while 51 percent of those who did not receive early care used a substance. The greatest differential was for smoking: Forty-five percent of women who did not receive early prenatal care smoked cigarettes, compared with 35 percent of those who did receive early care. There was no statistically significant difference in alcohol use between the two groups.

Among Hispanic women, the likelihood of using a substance was apparently unrelated to whether the woman obtains early prenatal care. The differentials in substance use were greatest among whites, who were far more likely to smoke cigarettes or mari-

juana if they did not receive early prenatal care. In general, the patterns for blacks were more erratic and not always consistent with expectations.

The patterns by educational attainment and age at birth are more complex. Among women with fewer than 12 years of education, the variation in substance use according to whether they had received prenatal care was not great. Among women with 12 years of education, the greatest differential was for marijuana use: Twenty-four percent of women who did not receive early prenatal care smoked marijuana during their pregnancy, compared with 13 percent of those who obtained such care. Among women with at least 13 years of schooling, we see substantial variation in the likelihood of smoking between those who received early prenatal care (20 percent) and those who did not (34 percent).

The Multivariate Results

To investigate the independent effects of a variety of factors on the likelihood of using a substance during pregnancy, as well as on the likelihood of single-substance vs. multiple-substance use during pregnancy, we used logistic regression analysis. Our principle objectives in these analyses were to determine whether some background characteristics are uniformly associated with substance use, regardless of the specific substance used, and whether prenatal care maintains an independent predictive effect when the other variables are controlled for. We ran parallel sets of equations including and excluding early prenatal care as an explanatory variable.

The independent variables include a fairly wide range of factors that other research has suggested are predictive of pre-

natal substance use, as well as, in some instances, prenatal care.⁹ The independent variables are dummy variables representing race/ethnicity (white/other is the omitted reference category); maternal education at the last prepregnancy point (13 or more years of schooling is the omitted category); a continuous variable indicating the mother's age at birth; family income at the last prepregnancy point (\$20,000 and above is the omitted reference group); (prospective) father present at last prepregnancy survey; urban residence; and enrollment in school at last prepregnancy survey. In addition, the equations include maternal aptitude, measured by the woman's score on the Armed Forces Qualification Test (AFQT) in 1980, and religiosity, measured by whether the woman attended services at least monthly in 1979.

The results of our multivariate analyses help clarify which of the background factors appear to be independent predictors of various behaviors. The fact that the explanatory variables included in the equations are measures as of a point in time preceding assessment of prenatal care and substance use makes it a strong model and lends credibility to the outcomes.* These background characteristics and behaviors should be, for the most part, exogenous to the process being considered—the interactions between prenatal care and substance use.

Table 6 (page 122) shows that even after all other background characteristics are controlled for, black and Hispanic women are significantly less likely than white women to use any of the substances, a finding consistent with other work.¹⁰ The only other factor that is predictive of below average substance use for all the substances is the father's presence in the home at the time of the survey immediately preceding pregnancy. The favorable effect of the presence of the child's father in the home, net of the effect of income and all the other predictors, may not only reflect psychological factors linked with parental interactions, but may also serve as a proxy for other unmeasurable factors linked with having both parents in the home.

A woman who has fewer than 13 years of schooling has an increased likelihood of smoking both cigarettes and marijuana. A similar pattern is apparent with respect to religiosity, with women who attend services less than monthly being more likely to smoke cigarettes or marijuana during pregnancy but no more or less likely to drink alcohol. Thus, there is fairly strong evidence that the determinants of smok-

*One caveat regarding the sample is, however, in order. To the extent that, for some women, early prenatal care detects problems that lead to abortion and that heavy smokers and drinkers are more likely to fall into this category, our first-birth sample may have some modest selection bias.

ing and alcohol use have distinctively different origins. The AFQT measure produces somewhat incongruous results, as higher AFQT scores are associated with a significantly decreased likelihood of smoking cigarettes but an above average likelihood of using marijuana.

Several factors appear to be uniquely linked with a greater likelihood of using one particular substance, but show no systematic association with substance use in general. For example, women who had their first birth at young ages were more likely to use marijuana, but were no more likely to smoke cigarettes or drink alcohol. This could reflect an age differential in the willingness to be involved with a substance that is illegal. Urban residents were well above average in their use of alcohol and marijuana, but not of cigarettes, possibly because young adults living in urban areas are likely to have easier access to these substances. Finally, young women enrolled in school were less likely to smoke cigarettes and may have been less likely to drink than women not in school.

With the exception of a possible tendency for women not receiving early prenatal care to be more likely to smoke cigarettes, it appears that there is no significant independent association between prenatal care and substance use. Thus, many of the associations between prenatal care and substance use that were apparent in simple cross-tabulations may reflect the fact that women not receiving prenatal care and women using selected substances share a number of the characteristics controlled for in the multivariate analysis. Our analysis does not suggest any significant independent links between early prenatal care and below average substance use during the pregnancy leading to first birth.

Since we established no association between substance use and the lack of early prenatal care, we suspected, and wanted to clarify, specific predictive factors that neglect of prenatal care and substance use have in common. We performed additional multivariate analyses in which the independent determinants of neglecting prenatal care were estimated (not shown). The factor that most consistently and strongly predicted both neglect of prenatal care and use of each of the substances during pregnancy was the father's absence from the home. Given that our equations control for family income, this strongly suggests that there may be important psychological concomitants related to the union of the expectant parents that are conducive to appropriate prenatal behaviors. Perhaps

Table 5. Percentage of first-time mothers who smoked or drank during pregnancy, by substance used, according to selected background characteristics and whether they received prenatal care in the first trimester

Characteristic and prenatal care variable	Any	Cig.	Alcohol	Marij.
Total	45.3	36.7	10.5	12.9
Prenatal care	44.0	34.8	10.3	11.9
No prenatal care	50.5	44.7	11.1	16.7
RACE/ETHNICITY				
Hispanic	25.2	18.6	3.7	9.8
Prenatal care	25.7	18.3	3.6	10.1
No prenatal care	24.1	19.4	3.9	9.1
Black	33.2	25.0	7.6	11.0
Prenatal care	34.2	25.8	7.9	12.5
No prenatal care	29.9	22.4	6.5	6.4
White/other	49.5	40.7	11.7	13.5
Prenatal care	47.3	37.8	11.3	12.0
No prenatal care	59.6	54.1	13.4	20.5
EDUCATION				
<12 years	53.4	46.9	6.5	17.9
Prenatal care	53.4	45.7	5.8	18.8
No prenatal care	53.4	49.7	8.1	15.7
12 years	50.5	41.5	12.3	15.0
Prenatal care	49.7	40.7	12.0	13.1
No prenatal care	54.3	45.4	13.5	23.5
≥13 years	31.1	21.4	11.2	5.6
Prenatal care	30.1	19.5	11.1	5.7
No prenatal care	37.8	34.2	12.2	5.1
AGE AT FIRST BIRTH				
<20	45.3	39.5	5.8	18.8
Prenatal care	43.8	37.7	4.1	18.2
No prenatal care	49.4	44.1	10.5	20.4
20-22	50.1	41.5	10.4	16.1
Prenatal care	48.1	39.2	9.9	14.3
No prenatal care	59.2	52.1	13.0	24.3
≥23	41.6	31.4	13.2	6.9
Prenatal care	41.2	30.1	13.8	7.0
No prenatal care	43.9	38.8	10.3	6.0

men and women who are more likely to engage in positive prenatal behaviors are also more likely to stay together during pregnancy, and perhaps the father-to-be serves as an additional source of information about dangers to infant outcomes.

Further, the presence of two interacting adults may be enough to generate social pressures necessary for better behavior paths. For instance, the presence of the man in the home may be evidence of both parents' concern about the child-to-be and may translate into a greater tendency to engage in healthy behaviors and refrain from unhealthy ones. In any case, this analysis makes clear that a substantial portion of the apparent links between substance use and neglect of prenatal care may really reflect family structure considerations.

Several other factors of interest did not attain statistical significance but showed

an expected negative association with obtaining early prenatal care. These included less education and young age at birth, factors that were also associated with substance use during pregnancy. The multivariate results are consistent with the notion that the apparent associations by education and age at birth reported earlier may at least partially reflect the greater tendency for the less educated and younger childbearers not to have the father of the child present in the home.

Our final regressions in Table 6 help us determine whether there are background characteristics that indicate a high-risk group who would be likely to use any substance or more than one substance. We can see from the table that with the exceptions of age at birth, AFQT score and prenatal care, all of the explanatory variables are associated (in the expected directions) with using at least one substance. However, while a wide range of demographic and socioeconomic characteristics distinguish substance users from nonusers, a very limited number of factors distinguish multiple-substance users from single-substance users. Compared with women who use only one substance during pregnancy, women who use more than one may be less likely to be Hispanic but are surely more likely to be younger at birth, to live in urban areas and to have a higher score on the AFQT. (The positive association of AFQT score with multiple-substance use is, of course, closely linked with the positive association of AFQT score with marijuana use during pregnancy.)

There is no apparent association between prenatal care and use of a single substance vs. use of more than one substance. Thus, while the cross-tabular results suggest a relationship between substance use and neglect of prenatal care, the multivariate analyses provide strong presumptive evidence that the association really reflects common linkages of several explanatory variables to both prenatal care and substance use.

Discussion

We have used unique data from the National Longitudinal Survey of Youth to explore several important issues for a vitally important group in the American population—young mothers having their first child. We have focused on women between the ages of 15 and 30 who were having their first birth during the 1980s.

In spite of massive ongoing public relations efforts directed at informing the American public about the hazards to mother, fetus and child that are associated

Table 6. Logistic regression coefficients for determinants of risk behavior during pregnancy leading to a first birth, by background characteristics, according to substance used and whether prenatal care is included in equation

Characteristic	Cigarette use		Alcohol use		Marijuana use		Any substance		Two or three substances†	
	Excluding prenatal care (N=1,664)	Including prenatal care (N=1,664)	Excluding prenatal care (N=1,664)	Including prenatal care (N=1,664)	Excluding prenatal care (N=1,664)	Including prenatal care (N=1,664)	Excluding prenatal care (N=1,664)	Including prenatal care (N=1,664)	Excluding prenatal care (N=698)	Including prenatal care (N=698)
Hispanic	-1.58***	-1.60***	-0.93***	-0.93***	-0.73***	-0.73***	-1.43***	-1.44***	-0.61*	-0.62*
Black	-1.23***	-1.22***	-0.45*	-0.45*	-0.42*	-0.41*	-1.09***	-1.08***	-0.03	-0.02
<12 years schooling‡	0.86***	0.85***	-0.16	-0.16	0.78**	0.77**	0.77***	0.76***	0.31	0.30
12 years schooling‡	0.51***	0.51***	0.16	0.16	0.56**	0.56**	0.40***	0.40***	0.44	0.44
Age at first birth	-0.005	-0.005	0.03	-0.03	-0.13***	-0.13***	0.00	0.00	-0.11***	-0.10**
Family income < \$10,000	0.48	0.47***	-0.06	-0.07	0.37	0.36	0.44***	0.44***	0.20	0.20
Family income \$10,000-\$19,999	0.25***	0.25	0.02	0.02	0.37	0.37	0.31**	0.31**	0.12	0.12
Child's father present‡	-0.55***	-0.51***	-0.45**	-0.44*	-0.36*	-0.34*	-0.49***	-0.47***	-0.34	-0.33
Urban residence‡	0.14	0.15	0.90***	0.90***	0.64***	0.64***	0.32**	0.33**	0.58**	0.58**
Enrolled in school‡	-0.69***	-0.69***	-0.59*	-0.59*	-0.04	-0.04	-0.50***	-0.50***	-0.23	-0.23
Attended religious services ≥ monthly§	-0.68***	-0.68***	-0.22	-0.22	-0.47***	-0.47***	-0.68***	-0.68***	-0.06	-0.07
Armed forces qualification test score	-0.001**	-0.001**	-0.001†	-0.001†	0.002***	0.002***	-0.001†	-0.001†	0.001**	0.001**
No early prenatal care	na	0.23*	na	0.09	na	0.09	na	0.14	na	0.14
Intercept	0.60	0.52	-2.92***	-2.94***	-0.79	-0.81	0.41	0.36	-0.11	-0.17
Likelihood ratio	1888***	1886***	961***	961***	1130***	1130***	2040***	2039***	793***	792***

*Significant at $p < .10$.**Significant at $p < .05$.***Significant at $p < .01$.

†Compared with women using one substance.

‡Measured as of the last survey prior to pregnancy.

§Measured in 1979.

††Numbers would be negative if not rounded.

Notes: Independent variables are dummy variables with listed category equal to 1, omitted education category is 13 or more years of schooling; omitted income category is \$20,000 and above; na=not applicable.

with substance use during pregnancy, we found that substantial proportions of younger women use cigarettes, marijuana or alcohol during the pregnancy leading to their first birth. This use is not equal across subgroups of the population: The least educated and the youngest are most likely to smoke both cigarettes and marijuana. Conversely, older mothers, who presumably would have the greatest awareness and concern about the risks they are taking, are most likely to use alcohol during pregnancy. In addition, white women are much more likely to use all three substances.

Because of the importance of early and effective prenatal care to the health of the mother and the infant, we also explored anticipated associations between the tendencies to initiate early prenatal care and to follow optimal behavior paths regarding substance use. There were valid reasons for assuming that within age and education groups, neglect of early prenatal care would be linked with a greater level of substance use during pregnancy. However, our final multivariate analyses found no statistical association. This lack of direct association certainly does not mean, however, that tendencies to neglect early prenatal care and to use substances during pregnancy do not have common

origins. For example, we have strong evidence that prospective mothers whose children's father is not in the home are both more likely to use substances and less likely to obtain appropriate early prenatal care.

Finally, we found that while significant numbers of younger mothers use one substance during pregnancy, a very modest proportion are multiple-substance users: Only about 13 percent of all mothers used two substances and only two percent used all three of the substances we considered. Thus, any potentially compounding influences on mother and child that may result from using more than one substance are likely to affect a small minority of mothers. Once again, however, the likelihood of multiple-substance use was not equal across subgroups. Women generally considered at greatest risk in our society—those least educated and youngest at first birth—were also most at risk for using more than one substance.

Although the receipt of early prenatal care by itself may not translate into a decreased likelihood of using substances during pregnancy, the importance of providing prenatal care to first-time mothers is in no way diminished. Indeed, the lower levels of early prenatal care obtained by the essentially disadvantaged subset of the population provide strong evidence of a

need for compensatory assistance in the prenatal area—regardless of whether associations with substance use exist.

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Medicaid and Pregnancy: Issues In Expanding Eligibility

By Embry M. Howell and Marilyn Rymer Ellwood

Summary

Recent federal and state policy has expanded Medicaid eligibility to provide health insurance coverage for pregnant women with family incomes below 133 percent of the federal poverty level. It has yet to be determined how such expanded coverage will affect enrollment in Medicaid or use of prenatal care. Using 1983 data from three states with widely divergent Medicaid programs—including one that already had most of the expanded eligibility options available today—this study found that about 40–60 percent of women who were covered by Medicaid at the time of their deliveries had not been enrolled in the program when they became pregnant. In addition, a large number of women did not receive Medicaid-covered prenatal care early in pregnancy, even though they were enrolled at that time. Almost all women in the study group visited more than one ambulatory care provider at some time during the nine months before birth and one year following birth; 29–51 percent visited more than one hospital outpatient department.

Introduction

Throughout the 1980s, federal and state governments passed a series of laws that broadened medical coverage of pregnant women and infants under the Medicaid program. Previously, most pregnant women were eligible for Medicaid only through the Aid to Families with Dependent Children program (AFDC); essentially, this meant they had to be single, already have children and be below the state's in-

A substantial portion of mothers were not receiving AFDC when first enrolled in Medicaid. In California, only 58 percent of delivering Medicaid mothers were receiving AFDC; in Georgia, 64 percent; and in Michigan, 70 percent.

come eligibility limit. This situation began to change with the Deficit Reduction Act of 1984, in which the federal government required all states to provide Medicaid coverage for single pregnant women with no children as well as those in two-parent families in which neither parent was employed, provided that they met AFDC income criteria. The same act also mandated states to cover all children up to age five born into such families after September 30, 1983, if their families met state income criteria. This assured Medicaid coverage of newborns in many low-income families.

The Consolidated Omnibus Budget Reconciliation Act of 1985 further expanded Medicaid coverage of pregnant women by requiring states to include all those pregnant women meeting state AFDC income and asset requirements, regardless of family structure. The act also required coverage of newborns and their mothers for 60 days after birth. Provisions of the Omnibus Budget Reconciliation Act of 1986 enabled states, at their option, to cover all pregnant women as well as children up to age five if their family income was below the federal poverty level. The 1986 act also allowed states to expedite Medicaid eligibility for pregnant women so they could avoid delays in obtaining prenatal care.

In 1987, states were given the option to provide Medicaid coverage to pregnant women and infants younger than one year of age with family incomes up to 185 percent of the poverty level. Subsequent laws required all states, by April 1990, to extend Medicaid coverage to all pregnant women and children up to age six if their family incomes were below 133 percent of the

poverty level. Finally, a 1990 law mandated continuous coverage throughout pregnancy and the child's first year of life, regardless of any changes in a family's financial status. It also extended mandatory Medicaid coverage of children up to age 19 born after September 30, 1983, in families with incomes less than 100 percent of the federal poverty level. (This law is to be phased in completely by 2002.)

While there is a broadly supported movement to expand Medicaid eligibility for pregnant women in order to improve birth outcomes, the literature suggests that enrollment in Medicaid may not necessarily be associated with early prenatal care.¹ There is evidence that Medicaid's cumbersome eligibility process, which often results in delays of weeks between the date of application and the date of approval, may pose a significant obstacle to obtaining early care.² Another obstacle to access is the declining participation in Medicaid by obstetricians, perhaps a result of low Medicaid reimbursement levels and steadily increasing malpractice premiums.³

Prior to the Medicaid eligibility expansions for pregnant women and children, states were enormously diverse in their coverage of these groups, making it possible to compare the impact of various initiatives on such measures of effectiveness as timing of enrollment, receipt of prenatal care and continuity of care under Medicaid. We have undertaken such a comparison to examine the possible impact of recently broadened coverage on care for low-income pregnant women.

Our study uses data on Medicaid financing of obstetric care in 1983 in three states—

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California, Georgia and Michigan—chosen because of the differences in their coverage of pregnant women under Medicaid at that time and because of the availability of detailed claims and enrollment data from the Medicaid Tape-to-Tape Project.

Methods

The Tape-to-Tape project was initiated by the Office of Research of the Health Care Financing Administration. Five states were chosen to participate from among those that volunteered to submit copies of the data tapes from their claims-payment systems. These systems (known as Medicaid Management Information Systems) differ among states, but federal guidelines assure some comparability of file contents and data definitions.

The five states—California, Georgia, Michigan, New York and Tennessee—were chosen because of the diversity of their Medicaid programs and their ability to provide complete files on eligibility, claims and providers for selected years. These have been edited and recoded into uniform file formats to facilitate cross-sectional and longitudinal analyses.

We identified all deliveries in October 1983 for which Medicaid paid all or part of the charges for the hospital stay in California, Georgia and Michigan. These criteria included deliveries for which the mother was not initially enrolled in Medicaid but became enrolled at some time during pregnancy or at delivery. Deliveries were identified using the diagnosis codes on Medicaid hospital claims. Mothers and infants were linked based on their Medicaid case numbers; for each mother and her infant, we extracted and linked all Medicaid eligibility and claim records for the 22-month period of January 1983 to October 1984.⁴

Medicaid Coverage

Table 1 shows the Medicaid eligibility requirements and options of the three study states in 1983. California had the broadest coverage. Its coverage groups included single pregnant women with no other children, pregnant women in families with an unemployed parent, and pregnant women in any low-income family, regardless of the parents' work status or marital status. In addition, California extended "medically needy" Medicaid coverage to those whose income was too high for them to receive AFDC benefits, but fell below a set medically needy income threshold. Also under the medically needy provisions, pregnant women could become eligible for Medicaid by incurring medical bills that could be subtracted from their income,

Table 1. Medicaid eligibility options and qualifying income levels, by state, 1983

Options and income levels	California	Georgia	Michigan
Option			
Single pregnant women with no eligible children	Yes	Yes*	Yes
Pregnant women in unemployed two-parent families	Yes	No	Yes
Pregnant women in other two-parent families	Yes	No	No
"Ribicoff group"	Yes	No	Yes
Medically needy women	Yes	No	Yes
Monthly qualifying income level (family of four)			
AFDC	\$625	\$238	\$492
Medically needy	\$834	na	\$492

*Became effective in July 1983.

Note: na=not applicable.

Sources: **Options**—I. Hill, "Broadening Medicaid Coverage of Pregnant Women and Children: State Policy Responses," Center for Policy Research, National Governors' Association, Washington, D.C., 1987. **AFDC Income Levels**—Office of Family Assistance, Social Security Administration, "Characteristics of State Plans for AFDC, in effect October 1, 1983," U.S. Government Printing Office, Washington, D.C., 1985. **Medically Needy Income Levels**—Medi-Cal Eligibility Manual (California) and Michigan Department of Social Services Program Reference Manual.

thereby meeting the state's medically needy income threshold. Finally, California covered under Medicaid all low-income children under age 21, regardless of family status. This coverage group, often referred to as the "Ribicoff group" after Senator Abraham Ribicoff who sponsored the legislation, extends Medicaid to all low-income children in any living arrangement, including two-parent families, and older children living on their own; pregnant women who are teenagers and live independently from their parents often qualify for Medicaid through this eligibility group. Because of California's numerous optional coverage groups and its high income eligibility levels, almost all pregnant women with incomes below the poverty level were potentially covered by Medicaid during the study period. In California, the medically needy income threshold in 1983 was

at 98 percent of the federal poverty level (\$848 per month for a family of four).

Michigan's program covered all but one of the optional groups of pregnant women: those in working two-parent families. However, Michigan's income eligibility levels for both women receiving AFDC and those eligible for coverage under provisions for the medically needy were only about 58 percent of the poverty level. Georgia's program in 1983 was representative of many restrictive state Medicaid programs prior to recent eligibility expansions. It covered few of the optional groups and its AFDC income eligibility level was only 28 percent of the poverty level.

Table 2 shows the results of calculations to determine the number of deliveries in each state for 1983 and the percentage of those deliveries covered by Medicaid. For comparison, the table also shows data from the National Hospital Discharge Survey.⁵ There were 12,045 identified Medicaid deliveries in the three study states in October 1983. The National Center for Health Statistics (NCHS) reported that in the United States as a whole, births in October were one-twelfth of all births that year.⁶ Assuming this was true in each of the study states and that the volume of October Medicaid deliveries closely approximated the average number of deliveries in each other month of 1983, we estimate that there were 144,540 Medicaid deliveries in California, Georgia and Michigan in 1983.

In comparing these figures to total births in these states in 1983, we found that Medicaid births were 23 percent of all births in California, 16 percent in Georgia and 24 percent in Michigan. A comparison to national data for 1984⁷ shows about 648,000 Medicaid births in that year—17 percent of births nationally. The Medicaid births in the three study states thus accounted for approximately 22 percent of the nation's Medicaid deliveries in 1983.

Table 3 shows demographic characteristics for Medicaid-enrolled mothers delivering in the study states and compares them to the characteristics nationwide of both Medicaid mothers and all delivering

Table 2. Number of Medicaid-financed deliveries, number of all deliveries and percentage of all deliveries that are Medicaid financed, for three states, 1983, and the United States, 1984

Category	Three-state total	California	Georgia	Michigan	U.S. total
Medicaid, October 1983	12,045	8,194	1,187	2,664	u
All 1983 Medicaid*	144,540	98,328	14,244	31,968	648,000
Total 1983 deliveries	659,293	436,143	90,032	133,118	3,853,000
Percent Medicaid	22	23	16	24	17

*This estimate is derived by multiplying the monthly total for October by 12. Note: u=unavailable.

Sources: **Total births by state**—see reference 6. **Total U.S. births**—see reference 5.

mothers. Medicaid mothers were considerably younger than U.S. mothers as a whole. Georgia had the highest proportion of young mothers; 33 percent of delivering Medicaid mothers in that state were teenagers, while in California the percentage was 24 and in Michigan it was 25. Nationally, teenagers accounted for 19 percent of Medicaid deliveries and 14 percent of all deliveries. In each of the study states, the teenage mothers were mostly between the ages of 18 and 19.

The table also shows racial distributions for two of the states as well as nationally. A large majority of Georgia Medicaid deliveries were to nonwhite mothers (81 percent), while in Michigan a majority were to white mothers. Race data were unavailable for Medicaid in California, but the NCHS reports a substantially lower proportion of deliveries to nonwhite mothers in California than in Georgia or Michigan.*

Table 3 also shows the proportion of Medicaid mothers living in metropolitan and nonmetropolitan areas. Again, there were differences among the study states and between those states and the nation as a whole. In California, almost all (93 percent) of Medicaid deliveries were for residents of metropolitan areas; in Michigan, the proportion was similarly high (83 percent). In Georgia, however, metropolitan-area residents, while still a majority, accounted for a much lower proportion of Medicaid deliveries (56 percent). Nationally, 67 percent of all births and 79 percent of Medicaid births were to residents of metropolitan areas.

Eligibility

We studied the different ways in which pregnant women could qualify for Medicaid in the three study states, expecting the proportion of women enrolled in Medicaid but not receiving AFDC cash assistance to vary considerably among the states because of their differing eligibility options. Table 4 (page 126) shows the distribution of the Medicaid deliveries in each state by eligibility group.* Although the basis of eligibility changed for some women during their pregnancies or later, study data categorized women according to their first eligibility group, as classification in this group provided them with initial access to Medicaid coverage.

In all three states, regardless of the eligibility options available, a substantial portion of mothers were not receiving AFDC cash assistance when first enrolled in Medicaid. In California, only 58 percent of delivering Medicaid mothers were receiving AFDC. Higher percentages of Medic-

Table 3. Percentage distribution of Medicaid deliveries for three states, October 1983; and percentage distribution of Medicaid deliveries and of all deliveries for the United States; by maternal characteristics

Characteristic	Three states			United States	
	California	Georgia	Michigan	Medicaid	All
Age					
<20	23.6	32.6	24.8	19.0	13.7
<15	1.4	3.7	1.2	u	0.9
16-17	6.8	7.9	6.8	u	4.1
18-19	15.4	21.0	16.8	u	8.7
20-29	62.3	57.1	64.6	68.0	63.4
≥30	14.1	10.3	10.6	13.0	22.9
Race					
White	u	19.5	61.1	43.0*	79.8
Other	u	80.5	38.9	57.0†	20.2
Residence					
Metropolitan area	93.1	55.6	82.6	79.0	66.7
Nonmetropolitan area	6.9	44.4	17.4	21.0	33.3
Total	100.0	100.0	100.0	100.0	100.0

*Includes all racial groups other than black. †Includes only births to black women. Note: u=unavailable.

Sources: U.S. Medicaid deliveries—S. Singh, AGI, personal communication, based on data from the National Survey of Family Growth. All deliveries—see reference 6. Geographic residence—see reference 5.

aid mothers received AFDC in Georgia (64 percent) and in Michigan (70 percent). These figures show that even prior to the many recent Medicaid eligibility expansions for pregnant women, Medicaid eligibility was not necessarily tied to receipt of cash assistance during pregnancy.

Table 4 also shows the degree to which the two states that had programs for medically needy women used these programs to cover obstetric care under Medicaid. In California, 42 percent of mothers qualified as medically needy, compared to 23 percent of mothers in Michigan. There are several reasons for the higher proportion of medically needy enrollees in California. First, California covered women with a family of four) with incomes up to \$834 per month after subtracting medical expenses from income, while in Michigan the income limit for medically needy enrollees was \$492 per month.

A second factor is that the medically needy group in California included pregnant women in any two-parent family meeting the medically needy financial requirements. At the time of the study, Michigan had extended coverage only to those pregnant women in two-parent families meeting the AFDC requirements for unemployed parents. Finally, California's program for medically needy women used a one-month accounting period for the calculation of income eligibility, whereas Michigan used a six-month period. For pregnant women with incomes above the medically needy threshold, shorter accounting periods generally mean that smaller medical expenditures are needed

for them to reach eligibility, and they increase the likelihood that low-income pregnant women will participate in Medicaid. In both California and Michigan, a significant proportion (eight percent and 13 percent, respectively) of mothers qualified for Medicaid under the Ribicoff provisions.

Some women in all three states were categorically eligible for, but did not receive, AFDC cash assistance. This group, classified as "other," includes women whose grant would have been less than \$10, women who chose not to receive AFDC, pregnant women with no children, women not yet eligible for a full month's AFDC benefit and women receiving four-month transitional Medicaid coverage because they left AFDC in order to work. In Georgia, the group of women eligible for but not receiving AFDC was large (36 percent of all delivering mothers); it included women receiving Medicaid under Georgia's new eligibility option, implemented in July of 1983, covering single women with no eligible children. Percentages of Medicaid mothers eligible for but not receiving AFDC were small in both California and Michigan.

Length of Enrollment

Turnover in Medicaid enrollment is frequent for AFDC recipients,⁹ but the patterns of entry into and exit from Medicaid

*These deliveries also include a small number of births to women receiving coverage under special state-funded programs administered by Medicaid, as well as to women covered under a federal program for refugees, also administered by Medicaid.

Table 4. Percentage distribution of Medicaid deliveries, by whether or not mother was receiving AFDC and maternal eligibility option, according to state, 1983

AFDC status and Medicaid eligibility option	California	Georgia	Michigan
Receiving AFDC	57.5	63.6	69.6
Single parents	42.5	63.6	u
Unemployed parents	15.0	0.0	u
Not receiving AFDC	42.5	36.4	30.4
Medically needy	41.5	na	22.7
Single parent or two-parent families	33.6	na	9.5
"Ribicoff Group"	7.9	na	13.2
Other	0.6	36.4	2.2
State program only/refugee	0.3	0.0	5.6
Total	100.0	100.0	100.00

Notes: In Michigan, pregnant women in families with unemployed parents are grouped with single parents; Georgia had no medically needy program in 1983; u=unavailable; na=not applicable.

enrollment by women during the period around delivery are not well established. Length of eligibility in the prenatal period is important, since it suggests the amount of Medicaid-financed prenatal care women can receive. In California and Michigan, states that provided more options than Georgia for women to become eligible during pregnancy, we expected more movement into and out of Medicaid during both the prenatal and the postpartum periods.

Figure 1 examines the length of Medicaid enrollment during the prenatal and postnatal periods for women who delivered in October 1983. The figure shows, by state, the proportion of women in the study who were enrolled in Medicaid during each month of the study period. January 1983 can be considered a baseline month in which women did not yet know of their pregnancies. Therefore, if they were enrolled in January, it was probably for reasons other than pregnancy. It is also likely that those who enrolled in the following nine months did so because of pregnancy.

There are clear state differences in enrollment patterns. About 40 percent of California women were enrolled in January 1983, compared with about 50 percent in Georgia and 60 percent in Michigan. The percentage enrolled rose steadily throughout the nine-month prenatal period in all three states, although at varying rates. Michigan percentages always remained higher than those of the other two states. California percentages remained lower than those of Georgia during the first trimester (January-March), but surpassed Georgia in the last two trimesters, as a higher proportion of California women

entered Medicaid after their first trimester. We conclude that California's higher income limits, and its one-month accounting period used to determine eligibility for medically needy coverage, rather than the availability of optional coverage groups, were the major factors in allowing women in that state to obtain coverage for pregnancy, since most of the coverage options were also available in Michigan.

About half of Georgia women enrolled after they became pregnant, with the proportion increasing significantly beginning in June. Many women may have suffered financially as a result of pregnancy and thus become eligible for coverage. It is also possible that some women who might otherwise have qualified for Medicaid did not seek coverage until after they knew they were pregnant. In addition, Georgia extended coverage in July 1983 to single pregnant women with no eligible children.

Figure 1 also shows enrollment for the first year postpartum among mothers in the study states. The percent enrolled declined steadily in all three states, but enrollment levels were higher than those of the prenatal period. At one year after delivery, more than 60 percent of all women were still enrolled in Medicaid. State differences were not as great in the postpartum period as in the prenatal period.

The average length of enrollment in the nine months prior to delivery was 5.6 months in Georgia, 5.9 months in California and 6.7 months in Michigan. The average length of enrollment in the year after birth was 8.5 months in California, 9.7 months in Michigan and 10.1 months in Georgia. Georgia mothers were enrolled for the shortest time in the prenatal period and the longest time in the postpartum period. California mothers, a higher proportion of whom were medically needy, left Medicaid after delivery more rapidly than those in the other two states.

Given that most women were not enrolled early in pregnancy, we examined use rates only for those enrolled. Table 5 shows the proportion of women enrolled in Medicaid who used Medicaid services by three-month intervals over the study period. By definition, all women in the study were recipients of services in October 1983. The table shows that, among the group of women enrolled for at least one month in each quarter, rates of use were still relatively low. During the first trimester, Medicaid services were used by only 65 percent of enrolled women in California and Georgia and by 74 percent in Michigan.

The charging of global fees by providers

Table 5. Of women enrolled in Medicaid in each trimester, percentage who used Medicaid-financed services, by state

Time period	California	Georgia	Michigan
Prenatal period			
Jan.-Mar. 1983 (1st trimester)	64.9	64.8	74.0
Apr.-June 1983 (2nd trimester)	75.2	70.0	83.2
July-Sept. 1983 (3rd trimester)	76.5	76.3	90.3
Oct. 1983 (delivery)	100.0	100.0	100.0
Postpartum period*			
Nov. 1983-Jan. 1984	86.4	84.4	93.5
Feb. 1984-Apr. 1984	85.7	80.2	89.0
May 1984-July 1984	83.1	75.5	84.1
Aug. 1984-Oct. 1984	83.4	76.0	83.3

*Includes mother and child care together because mother and infant could not be separated in the claims data.

Note: Includes only women enrolled at least one month in indicated time period.

may mask the extent to which enrolled women received prenatal services from Medicaid. (A global fee includes charges for a set of prenatal care visits and may also include the physician's delivery fee.) Women whose care was billed under a global fee may have received Medicaid-covered prenatal care services, but the claims data would contain no record of specific visits. It would, however, contain a record of other expenses, such as laboratory services. We examined use rates for those women who had no global fee bills (approximately half the sample) and found their Medicaid prenatal care use rates were as low as those for the full sample. We

Table 6. Percentage distribution of women with Medicaid-financed deliveries, by provider of prenatal and postpartum care, according to state, January 1983-October 1984

Provider	California	Georgia	Michigan
Any provider			
None	6.2	3.0	1.8
Single provider	8.2	8.4	2.4
Multiple providers	85.6	88.5	95.9
Obstetrician			
None	47.3	48.3	36.0
Single provider	37.7	32.0	35.4
Multiple providers	15.1	19.7	28.6
Pediatrician			
None	44.7	49.4	32.7
Single provider	38.0	30.9	28.2
Multiple providers	17.3	19.7	39.0
Hospital outpatient department			
None	21.4	15.7	11.4
Single provider	40.2	55.9	37.8
Multiple providers	38.4	28.5	50.8
Total	100.0	100.0	100.0

Note: Postpartum data includes mother and child care together.

conclude that many women, even women already enrolled in Medicaid, did not receive first-trimester prenatal care services, although it is possible that some obtained early prenatal care paid for by other sources such as private insurance or public clinics.

The use of Medicaid services in the postpartum period was higher in all three states than in the prenatal period. For example, in California only 77 percent of enrolled women used services in the three-month period preceding delivery, compared with 86 percent in the three-month period after delivery. (The postpartum data includes care for both the mother and infant, since it was not possible to separate the two enrollees in the Medicaid data files.)

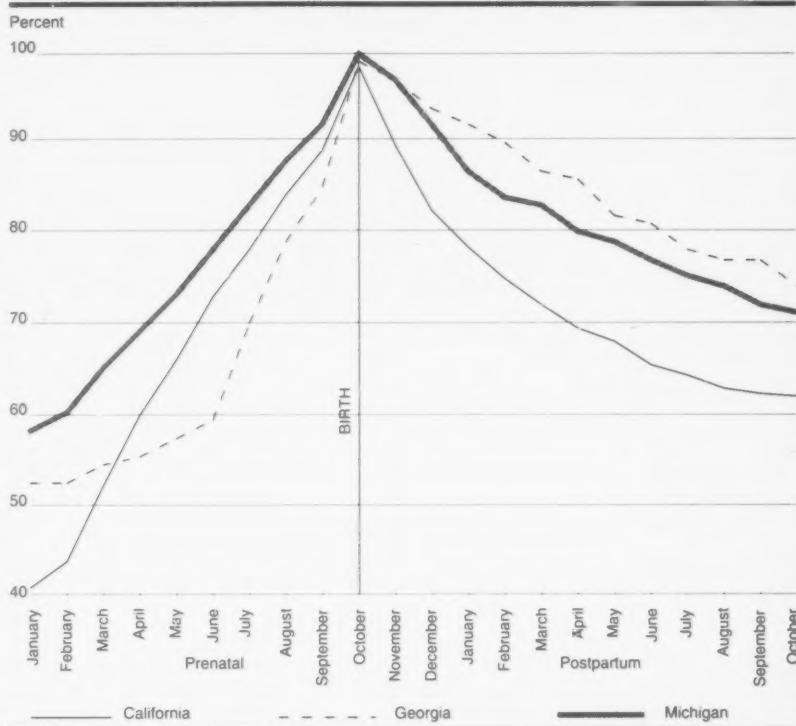
Providers of Care

Using provider identification numbers, we counted the number of individual ambulatory providers who cared for each mother-infant pair. Separate counts were produced for obstetricians, pediatricians, other types of physicians, hospital outpatient departments and clinics. Table 6 shows, by type of ambulatory care provider, the proportion of women who received no Medicaid-covered ambulatory care and the proportions receiving care from a single provider or multiple providers during the study period. The results indicate that from two to six percent of women apparently received no care prior to or following delivery. Similarly small proportions received all of their care from a single provider, while 86 percent (California) to 96 percent (Michigan) received their care from multiple providers.

From 36 percent (Michigan) to 48 percent (Georgia) of delivering women received no care billed to Medicaid by obstetricians. About a third of the women in each state received care from a single obstetrician. The remainder (15 percent in California, 20 percent in Georgia and 29 percent in Michigan) received care from more than one obstetrician.

Results for care by pediatricians were similar to those for obstetricians. Approximately half of the mother-infant pairs showed no use of Medicaid-covered pediatric services in California and Georgia while in Michigan, the proportion was about one-third. Thirty-nine percent of the pairs in Michigan used more than one pediatrician, about twice the rate found in other states. From 11 percent to 21 percent of women had no claims from hospital outpatient departments. Again, many women had claims from more than one such provider.

Figure 1. Percentage of women delivering in October 1983 who were enrolled in Medicaid in each month from January 1983 to October 1984, by state



Discussion

The findings on Medicaid-financed care in 1983 in these three very different programs suggest several issues that state and federal policymakers may want to pay close attention to as they move to expand their Medicaid programs to include more low-income women and infants.

• *Early prenatal care.* From 40 to about 60 percent of women whose deliveries were covered by Medicaid were not enrolled when they became pregnant, and the proportion of women enrolled increased during the prenatal period. However, in all three states, regardless of program structure, over 15 percent of pregnant women were not enrolled for the full three months prior to delivery. State eligibility policies for pregnant women clearly affected enrollment patterns. While both California and Michigan had coverage for medically needy women and their infants during the study period, a much higher proportion of women were enrolled in Medicaid through the provisions for the medically needy in California than Michigan. In Georgia, a significant increase in enrollment followed the introduction of Medicaid coverage for pregnant women without eligible children. If that group had been eligible for Medicaid

earlier in the study period, patterns in enrollment may have been different in Georgia.

In all states, many pregnant women did not enroll in Medicaid until late in their pregnancies; even then, many did not receive prenatal care covered by Medicaid. The California program, which already had liberal eligibility options and income standards in 1983, resembled quite closely the current nationally mandated Medicaid coverage for pregnant women up to the federal poverty level. Yet in California we found a higher percentage than in the other study states of women who enrolled late in their pregnancies. It may be that these women were working in the early months of pregnancy and thus would not have met the financial requirements of Medicaid at that time, unless they were incurring substantial medical expenses and subtracting these from their incomes to meet Medicaid eligibility. These data suggest that merely expanding Medicaid eligibility to more groups of pregnant women will not ensure that more women receive early prenatal care. The results also lend support to the importance of outreach and assistance to pregnant women during the Medicaid application process.¹⁰

• **Access to Private Physicians.** From one-third to one-half of delivering women received no Medicaid-financed services from private obstetricians, and similar proportions of their infants did not receive Medicaid care from private pediatricians. These data suggest that Medicaid-financed obstetric and newborn care was less likely to come from private practitioners than from hospital outpatient departments. Over three-quarters of pregnant women or their infants used hospital outpatient departments to some degree. Researchers at The Alan Guttmacher Institute observed a similar pattern nationwide. Using data from the National Survey of Family Growth, they found that in 1982, 60 percent of women whose deliveries were covered by Medicaid had their first prenatal care visit in either a hospital or freestanding clinic.¹¹

Some states have taken initiatives to increase participation of private physicians, although the long-term impact of those strategies is not yet known. As others have noted, market forces and physicians' attitudes, which affect Medicaid participation decisions, may be outside the control of Medicaid policymakers.¹² Alternatively, strategies to strengthen the hospital and clinic-based system that already exists may be effective in providing access to early and continuous prenatal care.

• **Continuity of care.** This study also provides preliminary data on the degree to which pregnant women and their infants used single or multiple providers under Medicaid. Our data provide only a rough measure of continuity of care, since there are many situations when more than one provider is required.

These data suggest that a lack of continuity of care is a problem for many Medicaid mothers and infants. For example, from 29 to 51 percent of mother-infant pairs had claims from more than one hospital outpatient department. It is unlikely that different hospital ambulatory-care providers would share their patients' medical records and coordinate their efforts. The proportion of women seen by a single ambulatory provider was low in all states.

Previous research has shown contradictory findings on the advantages of continuous care. One study found no improvement in objective measures of quality of care from improved continuity using measures similar to those used in this study.¹³ Another study, based on a smaller sample of pregnant women, found both improved satisfaction and improved birth outcomes.¹⁴ Promoting case management systems that are oriented to improving continuity of care may be beneficial for Medicaid mothers and their infants. While this alone may not lead to improvement in birth outcomes, it may increase satisfaction with care, which in turn may contribute to improved use of available services.

Data from this study indicate that, even in states that have added a variety of Medicaid eligibility options, coverage of obstetric and newborn care may still be more limited than we would like. More effort needs to be directed to enrolling women earlier in their pregnancies and ensuring that they will obtain prenatal care from either hospital outpatient departments or private physicians. In states where many women receive early prenatal care from sources not covered by Medicaid, such as public

clinics, policies are needed that encourage increased coordination between those sources of care and Medicaid providers.

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Comment

Evaluating Adolescent Pregnancy Programs: Rethinking Our Priorities

By Gerald Jay Stahler and Joseph P. DuCette

Introduction

Programs that provide care and services to pregnant and parenting adolescents have vastly multiplied during the past three decades.¹ Researchers and analysts in the field have noted that despite the millions of dollars invested in these programs by government and private sources, their impact on ameliorating the negative consequences of too-early childbearing is to a great extent unknown.² The overall conclusion of this literature is that evaluation represents one of the weaker aspects of the field and that more rigorous and sophisticated impact evaluations* are sorely needed.³ A handful of well-planned, well-executed and well-funded large-scale evaluations have been published (for example, Project Redirection,⁴ the Johns Hopkins Adolescent Pregnancy Prevention Project,⁵ the Mathtech study⁶ and the JRB Associates study⁷), and three other rigorous evaluations are currently under way (the state of Ohio's Project LEAP, the Office of Family Assistance Teen Parent Demonstration and the New Chance Demonstration). However, given the quantity of funds spent on adolescent pregnancy programs by government agencies and private foundations, the number and range of programs that exist nationally and the needs of this population, our knowledge concerning the effectiveness of such programs is slim.

We have come to believe that although criticisms of adolescent pregnancy program evaluations are well intentioned,

they are often unrealistic, given the circumstances with which most programs must contend—for example, limited funding, overburdened service commitments and lack of staff expertise in research design. This article describes some of the barriers that programs face in conducting impact evaluations, and it recommends that another evaluation standard be used in assessing the value of individual programs—one that stresses process evaluation,[†] responsiveness to program management needs and the collection of certain types of high-quality data that can be used for larger scale third-party impact evaluations.

We wish to emphasize that nothing in our argument should be construed to mean that we believe there is no need for evaluations of adolescent pregnancy programs. Both process evaluations and impact evaluations must be conducted, and they must be designed and implemented with the highest standards possible. The locus of responsibility for both of these types of evaluations, however, has usually resided with the individual program.

We have found that in general, process evaluations are usually handled quite well by most programs.⁸ It is generally the impact evaluations that are weak, a problem that is not unique to the area of adolescent pregnancy.⁹ To demonstrate positive outcome, it is usually necessary to compare program clients with untreated control subjects or with clients who participated in an alternative program. To a considerable extent, the problems in designing and

implementing a rigorous impact evaluation for an adolescent pregnancy program are inherent in the nature of the services being delivered, in the population being served and in the lack of fiscal and human resources available to individual projects.

Ideal Impact Evaluation Design

To better understand the reasons for the generally poor quality of impact evaluations conducted by individual programs, one must understand how an ideal impact evaluation would be designed. Its essential purpose is to show that the intervention has had a desired effect—for example, that the program has caused a significant reduction in the incidence of unintended pregnancies among adolescents.¹⁰

The classic design for determining causality is the true experimental design: Subjects are randomly selected and randomly assigned to an experimental group and to a control group. Josefina Card writes: "[Random assignment] is the method of choice and should be used whenever possible."¹¹ She also writes: "The random assignment procedures... are the ideal evaluation procedures for impact evaluation. All else is compromise."¹²

From a technical, scientific point of view, there can be no question that Card is correct in her assessment of random assignment. However, as others point out, when used in field settings, even this design probes causality rather than proves it.¹³ More critically, the true experimental design is often impractical or impossible in

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*We use the term "impact evaluation" to refer to an analysis that is somewhat different from what is gener-

ally called an "outcome evaluation." An outcome evaluation assesses what happens to clients during or after an intervention. For example, a typical outcome evaluation for pregnant and parenting adolescents would involve measuring infant health indicators following intervention. No causality is established in such an analysis. In contrast, impact evaluations are designed to determine whether it was the program that caused the outcomes and not just something about the teenage parent and her circumstances. Impact evalua-

tions usually require some type of comparison, such as a randomized control group, whereas outcome evaluations do not.

†By "process evaluation," we mean an analysis that not only documents the quantity and type of services that are provided to each client but also describes the program model in some detail, assesses the implementation of the program and reports the characteristics of the clients.

field settings, leading to the use of various forms of quasi-experimental designs that do not involve random assignment of subjects to experimental and control groups.* While there are several examples of excellent, large-scale programs that use technically sound designs, the typical smaller scale, single-site program rarely employs such a design or, if it does, often fails to implement it in the intended manner.

Barriers to Impact Evaluation

There are certain factors inherent in fieldwork that limit the viability of pure random design.

- **Costs.** Rigorously controlled impact studies using comparison or control groups are relatively expensive. Most programs barely have sufficient resources to meet their programmatic needs, let alone to fund evaluation research studies. Those programs that receive funding or have mandates to conduct impact evaluations, such as the demonstration projects funded by the U.S. Office of Adolescent Pregnancy Programs (OAPP) under the Adolescent Family Life Act, have generally been limited to using between one percent and five percent of their total budget for evaluation. This amount is usually insufficient to conduct any type of rigorous impact assessment. While the OAPP has recently embarked on funding "evaluation-intensive" projects, which can use up to 30 percent of their budgets for evaluation purposes, this type of funding priority is unlikely to characterize a majority of programs in the field.
- **Staffing.** There are two primary issues related to staffing—the competency of the evaluator and the relationship between the evaluator and the program's management and service providers. Rigorous impact evaluations usually need a highly trained evaluator who has a research background. Most projects do not have the resources to employ full-time professional evaluators or researchers. Sometimes hospitals or large institutions possess these resources, but most demonstration or externally funded programs employ consultants from universities or consulting firms to design

and carry out evaluations. While cost-efficient, this practice almost guarantees that evaluators will be perceived as outsiders.

The result is often poor cooperation between evaluators, service providers, data collection workers and program management. Almost inevitably, this practice also results in poor integration between program development, implementation and evaluation. It is nearly axiomatic in evaluation research that if program staff and management are not supportive of an impact evaluation, the evaluation is unlikely to be successfully completed.

- **Time.** Most programs allow too little time to elapse before establishing whether a program's objectives have been attained. Long-term follow-ups are rare because funding usually does not extend beyond a few years. Compounding the limited duration of most grants, many demonstration projects experience unforeseen delays in the beginning, and it sometimes takes one or two years before they are fully operational. Obviously, these problems have implications for the validity of the impact evaluation, since the program being evaluated during the initial period may be quite different from the program being implemented after the first or second year.

- **Data collection.** As Bruce Rocheleau points out, many programs may not achieve their goals because the underlying theory of the intervention is not valid or because the program lacks adequate resources, is poorly implemented or has an unreasonable set of goals.¹⁴ Distinguishing between these causes of failure requires precise documentation of the intervention for each client. Likewise, if the program is successful, this documentation helps define which parts contributed to its success.

An evaluation of whether a program's clients have better outcomes as a result of the program must track the services they receive as well as the intensity of these interventions. In programs where clients all receive the same number and mix of services, this is fairly straightforward. Most programs, however, vary the services offered in response to the needs and life circumstances of the clients, providing more intensive counseling, educational tutoring and different medical services as required. But many programs do not track exactly what services each individual receives and for how long. Since the impact of a program's intervention will most likely be different for an adolescent who stays in the program for two weeks compared with one who receives services for six months, it is difficult to assess the impact of the program without this type of information.

Compiling complete and accurate data can be difficult. Collecting good follow-up data is costly and time-consuming, and program staff are not usually in a position to collect these data. Most projects lack the resources to follow up on their clients, let alone find clients who have dropped out of their program. The result is data of less-than-optimal quality that will likely impair the ability to detect differences between experimental and control groups.

Further, determining the relationships between services received and client outcome is one of the most difficult methodological issues in evaluation research. The number and types of services that adolescent parents receive and the length of time they remain in the program may be confounded by client background characteristics that may also contribute to the outcomes of interest. For example, a teenage mother who comes from a dysfunctional family may be at high risk for program absenteeism, early termination and poor utilization of services, and at the same time is likely at high risk for repeat pregnancies, poor educational outcome and prolonged welfare dependency. Therefore, determining whether the treatment factors or individual client characteristics were responsible for the outcomes may be difficult.

- **Establishing control groups.** As mentioned, one of the hallmarks of a rigorous impact evaluation is the establishment of a control group whose outcomes are compared with those of the clients who receive the program's intervention (the experimental group). If the experimental group clients have significantly better outcomes than the control group clients, the program has been successful (if both groups have been determined to be similar to begin with).

Although the best design is one in which subjects are randomly assigned to these two groups, adolescent pregnancy programs do not typically use random assignment, but rather employ some variation of it.[†] Either way, resources at least equal to those devoted to collecting data on program clients must be devoted to the control group to provide an adequate comparison. Since control group subjects are presumably not receiving the program's services, they may be more difficult to track and interview than clients who are receiving services. Therefore, it could require more effort and resources to collect data on control group clients than on experimental group clients.

In situations where there are many more potential clients than can be served, programs can create a control group out of clients for whom services are not avail-

*For a generic view of this issue, see: T. D. Cook and D. T. Campbell, 1979, reference 12; for a review of alternative procedures to random assignment in the area of adolescent pregnancy programs, see: J. J. Card, 1988, reference 2.

†In addition, there may be an ethical issue in not offering services to potential clients. Withholding an "experimental" intervention is not unethical, according to one argument, because it is uncertain whether the program works. Most service providers, however, usually believe in the effectiveness of their approach and would probably not accept that argument.

able. However, if the selection of clients for the experimental group is done on anything but a random basis, the control group clients will most likely be systematically different from those clients who are accepted into the program. For example, if a program has limited space, it may adopt more restrictive criteria so that only the most needy clients or those who can best utilize the services will be accepted. The clients not accepted into the program constitute an inappropriate control group, since they may be less dysfunctional, have greater social support or be different from those in the program on some important dimensions that are conceptually linked to outcome.

Even if we assume that none of the above problems exist, and that a program can accept clients on a purely random basis, a true control group in the traditional sense of a "no-treatment group" is nearly impossible to obtain with a population of pregnant adolescents. Many, if not most, control group clients receive a wide variety of services from their schools, local hospitals and clinics, and social welfare and other agencies. These factors may have affected the early results of the Project Redirection study,¹⁵ which initially demonstrated a much smaller impact than anticipated, as well as the results of other studies.¹⁶

A control group in this field is generally a comparison group that has received some uncontrolled and perhaps unknown mix of services from various providers.* Thus, the evaluator should ascertain exactly what services the control group clients received so that it is known what the experimental treatment is actually being compared with. Unfortunately, in practice, it is often difficult to obtain reliable information on client services for a control group that is not in any particular program, or whose members may be enrolled in a variety of programs. Subject recall may be the only recourse, and the accuracy of such data may be questionable.

Recommended Strategy

Even with seasoned researchers and plentiful resources, it is extremely difficult to conduct rigorous impact evaluations successfully. Without experienced evaluators and adequate resources, and given the frequently encountered obstacles already described, the chances are even more remote. Does this mean, then, that program impact is irrelevant or untestable, or that we should not even attempt to assess the ability of adolescent pregnancy programs to meet their intended objectives?

Quite the contrary. We firmly believe in

the necessity of conducting thorough impact evaluations. What we question is the way in which many programs have been forced to conduct impact evaluations prematurely or with sparse fiscal or human resources. We also question whether it is necessary, given the limited resources, for all programs to conduct such evaluations.

We believe that a preferable alternative to having each program attempt to conduct an impact evaluation is for individual programs to focus on process evaluation and to collect complete and reliable data on their own clients. Third-party research entities should concentrate on larger scale, well-funded impact evaluations, most of which would include multiple sites with various program models that target different subpopulations. Impact evaluations that cannot be successfully completed and that cannot realistically attain a high standard of methodological rigor should not even be attempted. Similarly, funding agencies should not rigidly adhere to unrealistic expectations of what programs can and should be doing.

The field would advance further and more efficiently by having most individual programs focus their evaluation efforts on the following areas:

- *Program description.* Individual programs should seek to describe as completely as possible the program content, the logic of the intervention (e.g., what the intervention is designed to do and why it is presumed to work) and how the program is implemented.¹⁷ Deviations from the planned program should be documented. This type of process evaluation is important for understanding what the program actually is (as opposed to what it was planned to be), and it provides clues to why a program is successful or not and what elements of the program have a significant effect. Documenting the program model and components is particularly important for demonstration programs so other agencies can replicate effective programs or program components.

- *Client characteristics.* Detailed and accurate records on the program participants are necessary to understand what types of interventions work best with which types of clients and to compare results across programs. They are also necessary to ascertain whether the program is serving the intended target populations.

To facilitate comparisons across programs, the OAPP has developed an instrument, the Minimum Evaluation Data Set for Care Programs, "which measures antecedent, program, and outcome variables of interest to the central objectives of most

programs for pregnant and parenting teens."¹⁸ Its response categories match a number of national survey questionnaires, such as the National Survey of Family Growth, the National Longitudinal Survey of Youth and the National Natality Survey; this allows programs to compare their client characteristics with information contained in these national data bases. Clients are described according to demographic, educational, economic and health characteristics. Some examples of items are current school status, living arrangements, source of financial support, alcohol use, contraceptive use, infant birth weight and repeat pregnancies. If most programs adopted such a standardized data collection system, cross-project comparisons would be greatly facilitated.

- *Service utilization.* Service utilization data is also collected as part of the Minimum Evaluation Data Set. Without data on the length and type of intervention and the quantity of services provided, a causal relationship between changes and the intervention is difficult to determine. Further, providing information on what actually occurs in interventions will assist in the development of program theory,¹⁹ improve the ability to perform and interpret meta-analyses and provide better insight into causal explanations for client outcomes.²⁰

- *Outcome and long-term follow-up.* Follow-up of clients and assessment of outcome are often a project's weakest areas. Our experience indicates that many agencies collect data that are peripheral to the major purposes of the program and fail to collect adequate data on variables of central importance. For example, some programs collect data derived from various psychological scales (e.g., self-concept, locus of control and stress) but do not collect (or collect less adequately) data on such obvious outcomes as repeat pregnancies or use of birth control. Sometimes psychological scales are not explicitly tied to a program's major objectives.

Moreover, the ability to follow up clients, especially over more than two years, is very difficult for most programs. However, the ability to collect adequate data and to follow clients for at least two years should be one of the major criteria for program funding. Programs should give priority to collecting data on such objective outcomes as repeat pregnancies;

*An exception to this is when a specific service component is being evaluated within a single program—for example, family counseling vs. no family counseling—but our focus is on programs that are primarily on comprehensive programs.

health, educational and welfare status; employment; and the health status of infants. Evaluations can be directed toward periodically comparing these outcomes with the program's stated objectives.

The issue of how accurate and complete the collected data are, while acute at all points in the program implementation process, is most significant when the program nears the end of its funding cycle. All too often, when the major goal of the evaluator is to complete the final report to the funding agency, long-term follow-up data on clients are collected under less-than-ideal conditions by undertrained researchers. Collecting fewer, but more accurate and complete, data on each client is better than administering extensive questionnaires that have high nonresponse rates and are incompletely or poorly filled out.

- **Cost.** At a minimum, an analysis documenting the costs of each type of intervention should be done to assist managers in deciding the relative worth of various types of interventions. Since most decisions faced by program managers have cost implications, routinely analyzing the relative costs of various program components can be useful at the program as well as the cross-project comparison level.

- **Program penetration.** Most programs are designed to address the problems of a particular client population. The program may be well designed and well implemented, but if it does not reach the intended population or if it reaches only a small fragment of the target population, its impact may be minimal. Programs rarely attempt to confirm that they are reaching their target groups, but such data are greatly needed.

Third-Party Impact Evaluations

To paraphrase Joseph Wholey and colleagues, we believe that the responsibility for conducting evaluations should rest at a level that is appropriate to the types of decisions that the evaluation is intended to address.²¹ Therefore, rigorous impact evaluations should mostly be the responsibility of third-party entities that are independent of individual programs and do not have a direct stake in the results of the evaluation—primarily universities and research organizations that specialize in conducting evaluation research. They should be adequately funded and be responsible only to the funding agency, not to the program director. This increases the objectivity of the evaluation, because it removes the responsibility from the local project and internal evaluator, who may have a vested interest in positive findings.

The reporting and funding arrange-

ments are important in this context. For example, even when outside evaluators are used as subgrantees to individual programs, the evaluator may find his or her consulting contract reduced in subsequent years if the interim evaluation findings are critical of the program. Obviously, an internal evaluator who reports to the project director may face similar problems, especially when continued funding for services is perceived to be affected by the evaluation's interim or final conclusions. Clearly, the emphasis for funding agencies should be on a rigorously conducted evaluation, not on whether the evaluation demonstrates positive results. Other advantages of using third-party evaluators include the ability to select experienced researchers and the ability to differentiate clearly between the role of service provider and that of researcher.

Some third-party evaluations have aggregated the impact data from several programs and compared their relative effectiveness.²² Such a process is probably more objective than requiring each program to evaluate itself (since programs are obviously committed to demonstrating that their treatment is effective) and probably involves a considerable financial saving across the programs evaluated.

Third-party impact evaluations should have the following components:

- **Theory-driven analysis.** The evaluation should be premised upon the theory that underlies the intervention. Leonard Bickman suggests: "Evaluators must develop a more elaborate causal network that describes the bases of the program instead of relying on intuition and assumption."²³ An impact evaluation should not be conducted blindly, looking at impacts without taking into account what processes might lead to the results; rather, it should try to reveal what actually occurs in the program to cause the various types of outcomes and impacts.²⁴ In this way, the evaluation will deepen our understanding of how programs affect teenagers, uncover unintended effects and help evaluators specify intervening variables and differentiate between program failure and theory failure.²⁵

- **Control groups.** If random assignment is not feasible, comparison groups should be employed at each local site, as was done in the Mattech evaluation of sexuality education programs.²⁶ These comparison groups should be selected on the basis of being as similar to the experimental groups as possible. A detailed analysis should be performed on what services the control or comparison group clients actually received, since it is unlikely that these cli-

ents will represent a "no-treatment" group.

If it is not feasible to use control groups, "synthetic" comparison groups can be constructed. In these evaluations, program impacts are compared with expected outcomes from norms selected from national survey data or from previous studies, given a set of demographic characteristics on the clients. For example, nonprogram adolescents of the precise type utilized in program x have been shown to have a repeat pregnancy rate of y percent. The proportion actually found in the program can then be compared with this rate, and the relative effectiveness of the program can be ascertained. Card and colleagues,²⁷ with support from the OAPP, have developed a sourcebook of comparison data that allows for the construction of such synthetic comparison groups. We recognize that the current data base of information may fall somewhat short of what is needed for these synthetic comparison groups to serve their intended purpose. We believe, however, that the concept of the synthetic comparison group is potentially useful. Moreover, the use of third-party evaluators employing cross-site evaluation designs will greatly advance the sophistication of the data base for synthetic comparisons.

- **Multiple methods.** We encourage using multiple research methods in impact evaluations as well as combining quantitative and qualitative research. Qualitative measures can be used to gain a more thorough understanding of the client and how she or he experiences the interventions; aid in interpreting, understanding and confirming the quantitative data; provide a qualitative base for evaluating the validity of the quantitative measures; and help to generate new hypotheses.²⁸

- **Consistent core data.** In a multisite evaluation, the data collection needs to be consistent across sites. Thus, not only should the questionnaire items be consistent, but the way in which these questionnaires are administered must not vary significantly. The data collected should assess not only short-term outcomes (e.g., birth weight or number of complication-free deliveries) but also longer term impacts (e.g., parenting skills, the cognitive development of the child and client self-sufficiency).

- **Isolation of program components.** As the field of adolescent pregnancy care research begins to mature, impact evaluations should focus on the effects of specific interventions rather than on the more global comparisons of how the program as a whole compares to other programs. Admittedly, few impact evaluations have been successful in isolating the effective-

ness of individual components or in analyzing the relative contribution of various components to total program impact. Again, we believe that larger scale third-party evaluations have a better chance of accomplishing this goal than do the evaluation models typically used.

- *Long-term follow-up.* The need for long-term follow-up of client outcomes is one of the most frequently cited gaps in the field. The Project Redirection evaluation, for example, found that impacts changed over the course of five years.²⁹ As we suggested for the individual programs, we advocate following clients for at least two years.

- *Analysis of stable exemplary programs.* As Francine Jacobs has pointed out, service programs go through a developmental process.³⁰ Each stage requires a different evaluation procedure, and only at the most advanced stage is a true impact evaluation appropriate. Stephen Small has shown how the failure to realize this has severely hampered evaluation efforts for family life education programs.³¹ His comments are equally appropriate to the area of adolescent pregnancy programs.

We believe that it is important for impact evaluations to focus on programs that have already worked out their start-up problems and are somewhat stable in their intervention approach. In the Mathtech study,³² for example, experts first selected exemplary programs from around the country; these programs were then given time to improve prior to the initiation of the impact evaluation. It does not make sense to use scarce resources to conduct sophisticated evaluations on programs that do not seem to be exemplary, nor is it wise to perform impact evaluations on programs that are newly developing and are in the midst of working out the initial operational problems inherent in any new human services endeavor. Programs should be given sufficient time, possibly a year or more, to attain smooth function.

Conclusion

We are calling for a change in the way most adolescent pregnancy programs are evaluated and in the expectations funding agencies have for the evaluations undertaken by the programs they support. Evaluation should involve a collaborative effort in which resources are maximized and individual programs and third-party evaluators focus on their areas of expertise. Programs could use more of their resources on service delivery and process evaluation, while third-party evaluators would conduct rigorous impact evaluations.

The ultimate goals for these third-party

evaluators should be determining which programs and program elements work best with which types of clients, understanding how and why this occurs and assessing whether the benefits from these programs justify the costs involved. Attaining these goals requires extremely detailed process evaluation at the individual program level and precise and accurate data collection on client outcomes over a long enough period to allow adequate evaluation of the program's impact.

Rigorous impact evaluations that use sophisticated methodology and analyses will contribute substantially to knowledge about adolescent pregnancy care and prevention. But this can only be accomplished by redirecting the current resources—both human and fiscal—in a way that has a better potential for advancing the field.

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Special Report

How Well Do Women Comply with Oral Contraceptive Regimens?

By Michael Klitsch

Introduction

In the three decades since the first oral contraceptive was marketed, many aspects of the pill have been the subject of painstaking research. One result of the almost constant study and discussion has been a significant change in the pill's composition: To decrease side effects, hormone content has been reduced to levels far below those of the original pill. Among reversible methods, the pill's effectiveness has been clearly demonstrated to be surpassed only by the hormonal implant and certain IUDs. Researchers have concluded that the pill can protect against anemia and against the development of ovarian and endometrial cancer. Other than some lingering uncertainty as to the pill's role in the development of breast cancer, it would appear that nearly all that needs to be discovered about oral contraceptives already has been found out.

However, a January 12 symposium organized by the Association of Reproductive Health Professionals (ARHP)* quickly established that there are still a few things we do not know about the pill. For example, how often is the pill taken incorrectly? No one knows. What are the most common errors? No one knows. What factors most affect women's ability to follow pill-taking instructions? No one knows. How serious is the risk of accidental pregnancy for the user who occasionally misses a few pills? Even on this basic question, no one agrees. Thirty years after the pill's introduction, biological and behavioral issues related to women's compliance with the prescribed way of taking it remain virtually unexplored.

U.S. Pill-Taking

Americans may be among the most enthusiastic consumers of therapeutic drugs in the world, but they are not necessarily

good at it. One recent article quoted the National Council on Patient Information and Education as finding that half of the 1.6 billion prescription drugs purchased annually are taken improperly.¹ The same source notes that a 1982 Food and Drug Administration (FDA) study found that 40 percent of patients surveyed could not recall having been told by their doctor how much medication to take, how to take it or what to do if they forgot to take it.

At the ARHP symposium, Paula Hillard, a University of Cincinnati obstetrician-gynecologist, quoted the following as a suitable working definition of compliance: the "extent to which a patient's behavior coincides with the clinical prescription."² She added that compliance includes continuation, but is not synonymous with continuation: A person may continue taking medication for a long period of time, yet take it incorrectly for much of that time. Family planning research has often focused on continuation, but rarely has such research examined correct usage; as a result, very little is known specifically about how women use the pill.

Somewhat more has been learned about compliance with other types of medication: In a review of research on patient compliance, Marshall H. Becker cites studies indicating that highly motivated patients appear to comply better when they have been given more complete information, while less motivated patients' compliance does not seem to be affected by the provision of information.³ Compliance has also been shown to be better when physicians provide clear information to their patients than when their instructions are confusing.⁴ Complicated pill-taking regimens also appear to decrease compliance.⁵

In addition, evidence has accumulated that patients' adherence to pill-taking is determined by a combination of psychological factors—their degree of interest in or concern about their health, their percep-

tion of vulnerability, their awareness of the severity of the illness and their evaluation of the benefits and costs of addressing the problem.⁶ Although the style in which care is provided can affect compliance, such health beliefs about the risk of pregnancy are probably difficult for the provider to change (especially among adolescents, who often consider themselves invulnerable).⁷

One factor complicating the study of compliance is that it is very difficult to measure. "Ideally," Becker notes, "we would like to observe directly the extent to which patients consume prescribed drugs; because this is not possible, investigators have utilized pill counts or have looked for traces of drugs in blood or urine tests."⁸ However, pill counts are complex, and patients may not be truthful when reporting to researchers about their pill-taking. Screening of blood or urine may also be expensive and time-consuming, and the impact of individual variation may be so great that the results are not reliable.

Furthermore, there is no universally accepted definition of compliance. Some define it as behavior directly affecting the likelihood that the treatment will succeed or fail, but others define it as any significant departure from the prescribed course of therapy, even if this has no clear effect. For oral contraceptive use, noncompliance can run the gamut from never getting the prescription filled to taking every pill but starting the cycle of pills just a day late.

*The symposium, entitled "Maximizing Oral Contraceptive Effectiveness—Patient Compliance, Drug Interactions and Other Factors," was organized on behalf of the Association of Reproductive Health Professionals by Gardiner-Caldwell SynerMed, and was supported in part by a grant from Ortho Pharmaceutical Corporation. Presenters at the symposium were William C. Andrews, Herbert P. Brown, Ronald T. Burkman, Michael S. Burnhill, Philip A. Corfman, Ann J. Davis, Richard J. Derman, Jacqueline Darroch Forrest, Paula A. Hillard, Andrew M. Kaunitz, Linda S. Potter, Peter A. Schwartz, Sergio C. Stone and Louise B. Tyrer.

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Physical Effect of Missing Pills

When the pill is used regularly, it halts ovulation by suppressing the pituitary gland's production of luteinizing hormone and follicle-stimulating hormone to levels low enough that the ovary suspends development of egg-producing follicles. Occasionally, hormone levels rise sufficiently to permit some follicular activity, but estrogen levels associated with the development of the ovum are usually kept low enough that ovulation does not occur. Other physiological changes caused by the pill, such as the thickening of the cervical mucus, also help to hinder conception in the event of such "escape" ovulation.

What happens biologically when women miss some pills? The answer may depend on when in the pill-taking cycle the pills are missed. Providers have long focused on what a woman should do after missing one or two pills—take two the next one or two days. However, over the years, not all providers or information resources have agreed on what a woman who misses three or more pills should do. Presently, the consensus is that she should stop taking that pack of pills, use another method for 1–2 weeks and then start a new pack.

However, recent British studies have called some of these views into question. One showed that after having taken only seven oral contraceptive pills, women could skip another seven without risk of ovulation.⁹ Another, in which women using oral contraceptives containing 30 mcg of estrogen purposely skipped two consecutive pills between days 9 and 18, found little evidence of escape ovulation.¹⁰

John Guillebaud, medical director of London's Margaret Pyke Centre for Study and Training in Family Planning, has pointed out that pill users routinely skip seven days of pill taking in each 28-day cycle without risking escape ovulation, so missing a few pills in midcycle probably does not raise that risk. What may increase women's risk of escape ovulation, Guillebaud warns, is missing even one or two pills on either side of the seven-day pill-free interval (creating, instead, an eight-day or nine-day pill-free interval). A review of a number of pill studies concluded that normal follicular development may begin during the pill-free week, especially among women using low-dose pills, but then may be halted by the resumption of the next cycle of pill-taking. Missing pills at the end of the preceding cycle or in the early part of the next cycle might therefore increase the risk of escape ovulation, and the move to low dosages of estrogen may have reduced the margin of error.¹¹

Even this view is difficult to document, however: One study examined four consecutive cycles of pill use among 28 women, half of whom had been asked to stretch the length of their pill-free interval in their second and third cycles from seven to nine days and half of whom were to lengthen the interval from seven days to 11 days.¹² None of them showed signs of ovulation, leading the authors to conclude that many women might be able to abstain from pill-taking for up to 11 days before being at increased risk of escape ovulation. Another study, in which the pill-free interval was extended to 10 days among 20 oral contraceptive users, found that two of them had hormone levels indicative of ovulation.¹³ However, these and other, similar studies have involved very small numbers of women; given the large individual variation in how quickly hormones are metabolized, they cannot preclude the possibility that some women might be at risk of ovulation in the event of just a small increase in the length of the pill-free interval.

Furthermore, the association between occasional ovulation while taking the pill and the risk of pregnancy is unclear. One reviewer has stated that "very little good information exists to guide the practicing clinician in his management of the patient who is worried about the pregnancy risk of missing one or more pills."¹⁴ There is no agreement about whether a fertilizable egg is actually produced when follicular rupture occurs during pill use. And presuming that the woman continues to take the pill, the contraceptive protection afforded by the thickened cervical mucus and hostile uterine environment could still exist.

Compliance Problems

Uncertainty may exist over the risk of ovulation or pregnancy, but pill users do sometimes become pregnant. Ronald Burkman, a participant in the ARHP symposium and chairman of obstetrics and gynecology at Henry Ford Hospital in Detroit, observes that current oral contraceptive failure rates of around six percent "are simply not good enough. It's unclear how much they can be reduced by better contraceptive compliance, but it's worth examining."¹⁵ In addition, failure rates in particular subgroups of women—especially adolescents—are substantially higher. Because of the dearth of relevant research, many current beliefs on oral contraceptive compliance are based mostly on clinical observation.

According to the symposium participants, a whole variety of factors probably inhibit compliance—some biological, some social or psychological and some struc-

tural. Pill-related side effects are likely a major contributor to noncompliance. Richard Derman, associate professor of obstetrics and gynecology at Cornell University Medical College, cited amenorrhea, androgenic side effects, breakthrough bleeding and fear of cancer as important reasons for noncompliance. With regard to amenorrhea, Derman cited a British study indicating that two out of five pill users would delay starting a new pill pack after their seven-day pill-free interval if they had not bled during the interval.¹⁶ Such a lengthening of the pill-free interval could place these women at risk of escape ovulation. Peter Schwartz, director of the department of obstetrics and gynecology at Reading Hospital and Medical Center in Pennsylvania, concurred about the importance of amenorrhea: According to one study, it may be a more common cause of discontinuation than irregular menses.¹⁷ There are few good data on the impact of menstrual changes on compliance, Schwartz concluded.

Many users and providers believe breakthrough bleeding indicates that the woman is at an increased risk of pregnancy, because it is taken as an indicator of escape ovulation. However, one recent study found that this is not always so: Breakthrough bleeding occurring late in the cycle was rarely associated with escape ovulation, whereas ovulation sometimes occurred early in a cycle with no accompanying breakthrough bleeding.¹⁸

Nonmedical factors may also be substantial contributors to noncompliance. Instructions on pill-taking may be too few, too many or too varied, and pill packaging may be more complex than is ideal. At the symposium, participants described the bewildering array of oral contraceptive packages and regimens. For instance, users who switch from 21-day packs (without placebos for the pill-free interval) to 28-day packs (with placebos), or vice versa, may be confused by these differences if they are not warned by the provider. Andrew Kaunitz, director of ambulatory care and family planning at the University of Florida Health Science Center, reported at the symposium that in his experience, women using 28-day packs often skipped their placebos and then occasionally lost track of when to begin their next pack.

Manufacturers and providers also sometimes disagree over the optimal time to start the pill—on the first Sunday after the onset of menstrual flow (known as the Sunday start), on the first day of menses (Day 1 start) or on the fifth day after menses (Day 5 start). The advantage of the

Sunday start is that pill-taking is initiated on a convenient, easy-to-remember day of the week. One disadvantage is that if the woman's menses begin, for example, on the preceding Monday, there is a small chance that follicular development might have begun by the next Sunday, before she has started pill use. Another is that users who forget to purchase their next pill cycle in advance may have problems getting their prescription filled over a weekend. Despite these potential drawbacks, Derman reported, market research findings show the vast majority of providers and users to favor Sunday starts. (This may be related to the fact that most currently available pill packs have a Sunday start.)

Pill makers' instructions also may conflict over what to do if pills are missed or if side effects occur. This lack of uniformity leaves some potential for confusion among users, and complicates the task of clinic counselors. Even more important is that women with problems or questions may not be able to find answers from the patient package insert (PPI) included with each pill pack. Michael Burnhill, director of ambulatory care services in the department of obstetrics and gynecology at the University of Medicine and Dentistry of New Jersey, described the current PPI as a "disaster." He added that while separate booklets prepared by manufacturers have helped, these also have lacked uniformity and have sometimes included errors.

In 1990, the FDA asked Family Health International (FHI) to recommend how to standardize pill-taking instructions. A few weeks before these were to be presented to the FDA's Fertility and Maternal Health Drugs Advisory Committee, Linda Potter of FHI discussed them at the symposium. Among other things, FHI recommended that the PPI make important information easy to find and read, and be detailed but in a format that offers quick reminders. On February 8, the Committee voted unanimously that pill-taking instructions be standardized and simplified.* The FDA subsequently notified manufacturers that they could use the FHI recommendations as a model for a new set of instructions.

*Specifically, the Committee recommended that instructions be written at a fifth-grade or sixth-grade reading level (rather than the current 10th-12th grade level) and be printed in large type. They should also include the general information necessary for correct pill-taking (such as when to start the first pack, how to take the pill each day and what to do if pills are missed). The Committee also urged that an illustration of the appropriate pill pack be included, and that the pack itself be clearly labeled as to where the user should start and in what direction she should go.

Provider-related factors can also contribute to noncompliance. For example, clinic hours and requirements may increase the difficulties women encounter in obtaining pills and taking them correctly. Paula Hillard observed that most clinics and physicians' offices have limited weekend hours, which can make it difficult for patients to start a new pill pack on Sunday if they forgot to purchase their next pack in advance. Some women (especially teenagers) may be put off by required pelvic examinations. In addition, in many areas, Medicaid and health maintenance organizations permit patients to purchase only one cycle of pills at a time, thus increasing the chance of transition problems between pill packs.

Finally, there are a host of personal and behavioral factors that may affect compliance, most of them relatively unexplored (at least in regard to oral contraceptives). Hillard noted at the symposium that some women who use the pill incorrectly a few times and do not become pregnant may then be reinforced in their belief that they won't get pregnant, and as a result may use the pill even less correctly. In his discussion of nonmenstrual side effects and their impact on compliance, Sergio Stone, a professor of reproductive endocrinology at the University of California at Irvine, contended that pill users are far less concerned with the less immediate benefits of pill use (such as prevention of certain types of cancer) than they are about the more tangible side effects, such as weight gain and acne, that affect their body image. However, cancer worries probably do play a role in compliance: Peter Schwartz pointed out that unexpected vaginal bleeding may trigger fears of cancer and lead to discontinuation or less committed use.

Research Priorities

Although much remains to be learned about oral contraceptive noncompliance, the necessary research—both biological and behavioral—will not be simple to carry out. Ronald Burkman believes that "tackling compliance issues should stand fairly high in the order of priorities."¹⁹ He suggests that behavioral studies should be undertaken as soon as possible, perhaps starting with research in which large numbers of pill users are contacted by phone at different times in their cycles and asked how many pills are left in their packs. Such research would at least provide some baseline data on how many women skip pills or take them incorrectly.

Behavioral research is difficult to conduct, in part because of patients' unwillingness to admit that they have not fol-

lowed directions. Thus, Potter notes, pill-taking errors related to misinformation are probably well reported, because the women do not realize they have erred, but other types of problems are probably underreported. For example, women who do not realize that they should begin their next pill cycle after no more than seven pill-free days will be more likely to report that they waited an extra couple of days than will those who knew but failed to start the pill on time for some other reason.

One of the most intriguing possibilities for avoiding such problems is the use of "smart" dispensers. One study examined the frequency with which epileptics failed to take their medication, using a pill bottle containing a microchip that recorded each time the bottle was opened.²⁰ (The investigators presumed that few patients would open the bottle but fail to take a pill.) The research revealed that 76 percent of patients took their medication when they were supposed to; those asked to take one pill per day did so 87 percent of the time, while those asked to take four pills each day did so only 39 percent of the time.

Similar preliminary research has used pill packs containing microchips that record when the pill has been punched out of the package. According to Linda Potter, these initial efforts have sometimes revealed substantial differences between patients' reports of their pill-taking and their actual pill-taking patterns. However, even this method is flawed, since it assumes that once the user removes a tablet from its package, she then takes it.

Potter, who has been involved in several international studies of oral contraceptive compliance,²¹ argues that more biological research is needed as well, commenting that "biological variation among women is probably more important to the risk of accidental pregnancy than is variation in pill-taking behavior." In addition, Potter believes that more compliance research should be conducted during clinical trials of contraceptive methods.

Unfortunately, both types of research are complex. The kinds of biomedical research needed to study the physiologic processes occurring during pill use often involve performing laboratory tests on blood samples and conducting sonograms several times each week or month. Such studies are complex, expensive and demand a big commitment from the patient; thus, these studies are (by necessity) small, and study participants are not necessarily representative of all pill users. Moreover, individual cycle-to-cycle variations in hor-

(Continued on page 138)

Books in Review

The Population Wars

Nature Against Us: The United States And the World Population Crisis, 1965-1980

by Peter J. Donaldson, *The University of North Carolina, Chapel Hill, 1990, \$29.95, 207 pp.*

Reviewed by Rodolfo A. Bulatao

Peter J. Donaldson tells the story of how the U.S. Agency for International Development (AID) became a missionary for family planning around the world and considers what difference the agency has made. His story has no real villains, because Donaldson appears sympathetic to both the proselytizers and the proselytized, as well as to both the Washington bureaucrats seeking to expand their reach in the service of a greater good and the local government officials saving face by turning aside foreign diktats. But the tale does appear to have a hero, albeit a tragic one.

The story is a great dialectic, involving two opposing ideas: that population growth can and will take care of itself; and that the world can be saved by widespread contraceptive use. Donaldson weaves these concepts through a discussion of American ideology, bureaucratic development, world reaction to the American impetus and the results of AID's activities. To those on one side, the population crisis required going to war, with no hostages taken, no holds barred and American population officers in the vanguard of a worldwide coalition. To those on the other, development had to be given time to work; patient diplomacy respectful of local prerogatives and village cultures was the only approach that held out any hope of ultimate success.

Donaldson sets the stage by discussing the conservative Catholic opposition to

contraception, a force that might have been expected to impede an American initiative in this area. He questions not why Catholics opposed "unnatural" contraception but why they did not oppose it more strongly. His answer lies in the popular acceptance among Catholics of John Courtney Murray's theory of civic culture in which different faiths coexist by respecting each other's beliefs.

But why, then, did American culture adopt an aggressive population policy? The susceptibility was rooted in "our national self-confidence" [p. 19] in the ability to control one's environment, the thinking that almost all problems around the world are merely technical or administrative. The goad was concern about strategic American interests threatened by rapid population growth. Thus, population control was a sacred crusade to bring contraceptives to the masses, but it also shared of the snobbery of the privileged. Unfortunately, this part of the story is somewhat obscured by the author's moving back and forth over time, selecting appropriate quotes. (He is sometimes vague on chronology.)

Next, Donaldson explains how population growth was transformed from the "preoccupation of a band of enthusiasts" [p. 31] to an extensive federal bureaucracy with mutually supportive links among universities and nonprofit organizations. He begins with the birth of AID in 1961 and traces the evolution of the population program from the \$2 million it provided in international population assistance in 1965 to the \$185 million it provided by 1980.

The story has elements of Greek tragedy. The concern of the population crusaders seems to have been, from the first, to find and rally around "a zealot of the sort the population control lobby would find praiseworthy" [p. 36]. The early AID effort, in contrast with their desires, was "never overwhelming in its enthusiasm" [p. 39]. By the late to mid-1960s, world

food shortages and other critical events had put population control high on the agenda for development aid, and advisory committee reports and even presidential statements had acknowledged its importance. Nevertheless, "supporters of a more interventionist role for the U.S. government remained disappointed by the limited concern that the problem of rapid population growth caused among senior AID officials" [p. 41]. Donaldson consistently describes official statements and activities throughout this period as cautious.

The population crusaders got their wish when Reimert Ravenholt took over and built up the population effort. With strong convictions, a talent for promoting programs and no inclination to be reasonable, Ravenholt single-mindedly turned AID into the leading supplier of contraceptives in the developing world. Ravenholt is the only person Donaldson profiles in the book. Although the contributions of other players as varied as William H. Draper, Jr., Frank Notestein, John D. Rockefeller 3d, David Bell, Philander Claxton and Bernard Berelson are mentioned—their memos apparently scrutinized and their most relevant quotes extracted—Donaldson does not attempt to bring them to life. In contrast, we are told about Ravenholt's Dutch ancestry, his early career in public health and medical school, his edge of wildness and his capacity for physical intimidation (the author describes one incident where Ravenholt burst into a population official's office "screaming at very close range and . . . flailing [his] arms" [p. 101]).

We are also told of Ravenholt's substantial accomplishments as seen by many who were there. His dictum was "ordering contraceptives is like ordering bullets for a war. You don't want to run out" [p. 106]. He followed this rule doggedly and to excess, ruffling sensitivities and accumulating critics and enemies. The endgame began in 1977 with one of those reorgani-

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zations that run like earthquakes through public bureaucracies. Ravenholt's program was being sliced into pieces for the regional AID bureaus, and within a few years he was pushed, kicking and screaming to the end, out of the agency.

Donaldson goes on to describe world reaction to the American population program, particularly at the world population conferences in 1974 and 1984. These conferences featured ideological battles and striking reversals of position by both the United States and a large group of developing countries. However, lacking a focus on a central figure, this story does not come as vividly to life as the earlier bureaucratic battles. There is more to say about actors and actions in the population field outside the United States, but this is not the book in which to find such descriptions.

In reflecting on what good the American population program did, Donaldson takes a detour. He first recounts the Population Council's role in the Korean family

planning program, giving pieces of the broad picture. However, his focus is heavily on Korea's initial problems in procuring materials for the manufacture of IUDs and on the American role in finding the money. (This is an interesting echo of his discussion of Ravenholt's predominant focus on providing commodities.) The Korean episode is supplemented by a short analysis that suggests that greater foreign aid is associated with better family planning programs and by a review of the scientific arguments on whether fertility responds to family planning or to socioeconomic development.

In the debate over development and family planning, Donaldson's heart is clearly with the family planners. He judges the AID program, presumably after changes built on the Ravenholt years, to be "remarkably humane, well designed, effectively implemented, and useful" [p. 176]. And yet, coming down to specifics, he sees "little evidence that Korea genu-

inely required what the United States had to offer" [p. 151]. He identifies the key factor in the Korean fertility decline as the "growing desire on the part of men and women to avoid the physical and financial burden of too many children" [p. 152], which he in turn attributes to the spread of education. So development, after all, could have been the critical factor.

The patient historian should commit himself, and after painstaking research, favor the reader with some opinion about the effectiveness of opposing tactics. But this is not a dispassionate recounting of the last war (though Donaldson does spend some surprising pages trying to draw parallels between the growth of the population program and the Vietnam buildup). It is closer to a report from the battlefield, with some skirmishes completed and some objectives won but with new battles still to be fought. Thus, the fog of war still hangs over the book's final postmortems.

How Well Do Women Comply . . . ?

(Continued from page 136)

hormone levels and biological activity are enormous. Thus, if only a minority of women (for example, those with especially low natural hormone levels) are vulnerable to escape ovulation, a one-cycle biochemical study may reveal no ovulation simply because the handful of vulnerable women did not experience a problem in that particular cycle.²²

Questions concerning oral contraceptive compliance present the family planning field with a daunting research agenda for the next decade—exploring an area where behavior and biology intersect in ways that are as yet unclear. Yet as difficult as this prospect may be, such research may be as important as any oral contraceptive research completed so far. In the foreword to FHI's presentation to the FDA, Malcolm Potts, president emeritus of FHI, writes that "today, tens of millions of women around the world use the pill, and it is poised for continued, and perhaps even wider, use in the rest of the century. . . . If we could improve pill-taking, here in the United States and at world level, then we might prevent literally millions of unintentional pregnancies."²³

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Over Past 30 Years, Most Developed Countries Have Had Substantial Declines in Infant Mortality

Declines in infant mortality rates since 1960 in 30 developed countries have exceeded expectations, according to an analysis of infant mortality in these countries.¹ In Japan, Spain, East Germany and Italy, infant mortality rates have declined by nearly 80 percent over the last 30 years. The difference in the mortality rate by sex has decreased in most countries with a history of low overall infant mortality, such as Switzerland, Sweden and Norway, but has increased in countries with intermediate or high levels, such as Yugoslavia, Greece and Austria. The proportion of mortality occurring in the first week of life has also decreased in countries with low overall infant mortality rates, but has increased in countries with higher rates, bringing the differences in the rates by age somewhat closer together across countries. Infant deaths due to infectious and respiratory diseases have declined, so that death from congenital anomalies and perinatal conditions now represents more than 60 percent of infant deaths in almost every country.

Overall Trends

Japan, which currently has the lowest infant mortality rate, showed the most dramatic decline of any country studied (Table 1). Rates dropped from 30.7 deaths per 1,000 live births in 1960 to 4.8 deaths per 1,000 live births in 1988—a decrease of 84 percent. Close behind Japan are Sweden, Finland and Switzerland. Spain, West Germany, East Germany and Austria have each surpassed more than 10 countries since 1960. Italy also made considerable progress; its infant mortality rate declined from 43.9 deaths per 1,000 live births in 1960 to 9.5 deaths per 1,000 live births in 1988. However, since 1960, Norway, Australia, New Zealand and England and Wales slipped from the list of countries with the 10 lowest infant mortality rates.

The difference between the highest and lowest infant mortality rates among the 30

countries has decreased since 1960, when there was a difference of 71 deaths per 1,000 live births, to a current difference of 20 deaths. However, levels in the Soviet Union, where infant mortality has declined more slowly than in any other country studied, have a profound effect on these figures: When the USSR is included in the analysis, the mean of all 30 infant mortality rates in 1987 is 15 deaths per 1,000 live births; without the USSR it is 10.5 per 1,000.

The overall rate of decline in infant

mortality among the 30 countries was four percent each year during the 1960s, 1.5 percent from 1970–1975, 3.9 percent between 1975–1980 and 2.2 percent between 1980–1988. Over the entire 30-year period, the annual decline averaged 3.1 percent. The fastest rates of decline occurred in two countries that began the 1960s with widely divergent infant mortality rates: Japan started at 30.7 deaths per 1,000 live births and experienced a decline of 6.4 percent annually over the 30-year period, and Portugal, starting with a rate of 77.5 deaths in 1960, declined by 6.2 percent annually over three decades. The slowest declines occurred among countries of diverse social and economic organization (making an explanation according to these factors impossible): Infant mortality rates in the Netherlands, Australia, Czechoslovakia and the Soviet Union each declined by an average of less than three percent annually.

Rates by Sex and Age

In developed countries that have usually had low rates of infant death, mortality rates among male infants in the early 1960s were at levels roughly 30 percent greater than those of females. In countries with extremely high rates, males were approximately 10–15 percent more likely than female infants to die. Figures for 1985–1987 show that the difference between the sexes has grown smaller in countries with low overall infant mortality (Japan, Sweden, the Netherlands), and increased in countries with histories of intermediate or high rates (Yugoslavia, Hungary, Romania).

The global trend toward declining infant mortality, notes the researcher, has meant an increase in the proportion of deaths in the early neonatal period in many countries. In such instances, advances in perinatal care have improved survival rates for both sexes, but particularly among male infants, who have traditionally been at a biological disadvantage. This disad-

Table 1. Infant mortality rates* for 1960 and 1988, by country

Country	1960	1988
Japan	30.7	4.8
Sweden	16.6	5.8
Finland	21.0	6.1†
Switzerland	21.1	6.8
Canada	27.3	7.3†
Netherlands	16.5	7.6
W. Germany	33.8	7.6
France	27.4	7.7
Denmark	21.5	7.8
Austria	37.5	8.1
E. Germany	38.8	8.1
Norway	18.9	8.4†
England and Wales	21.8	9.0
Spain	48.0	9.0†
Australia	20.2	9.2
Belgium	31.2	9.2
Ireland	29.3	9.3
Italy	43.9	9.5
United States	26.0	9.9
New Zealand	22.6	10.0†
Israel	31.0	10.0
Greece	40.1	11.0
Czechoslovakia	23.5	11.9
Portugal	77.5	13.1
Bulgaria	45.1	15.0†
Hungary	47.6	15.8
Poland	56.8	16.2
Yugoslavia	87.7	24.8
USSR	35.3	25.1
Romania	75.7	25.6‡

*Deaths of children under one year of age during a given year per 1,000 live births in the same year.

†1987. ‡1985.

Source of data: United Nations, *Demographic Yearbook*.

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vantage is particularly evident as discrimination against female infants has grown less frequent, thus increasing differences in infant mortality between the sexes in countries where environmental factors play a declining role in infant deaths.

During the 1960s, a low infant mortality rate usually meant that most of the infant deaths occurred in the first week of life. In Sweden and Denmark, for example, where the infant mortality rates in 1960-1961 were 16 deaths and 22 deaths per 1,000 live births, respectively, two-thirds of infant mortality occurred in this early neonatal period. In Romania and Portugal, on the other hand, the infant mortality rates were 73 deaths and 83 deaths per 1,000 live births, and two-thirds of infant mortality occurred after the first month of life.

Throughout the 1970s and 1980s, the differences between countries in infants' ages at death grew smaller. The proportion of deaths occurring in the early neonatal period decreased in countries with usually low infant mortality rates and increased in those with higher rates. In Norway and New Zealand, for example, the percentages of infant deaths occurring among neonates decreased from approximately 56 percent and 57 percent, respectively, in 1960 to 27 percent and 35 percent, respectively, in 1985-1987. In Yugoslavia and Portugal, the percentage of early neonatal deaths went from 22 percent to 45

percent and 18 percent to 58 percent, respectively, over the 30-year period.

The researcher attributes the reduction in early infant deaths to progress in combating congenital anomalies and perinatal conditions. This progress could have been influenced in turn by advances in perinatal medicine, social changes such as increased care during pregnancy, and changes in fertility rates.

Rates by Cause

The most prevalent causes of infant death in recent years have been congenital anomalies and perinatal conditions, representing more than 60 percent of infant deaths in nearly all countries. Deaths due to congenital anomalies have declined the least, particularly in those countries where infant mortality was greatly reduced, such as Japan and Portugal. Deaths due to perinatal conditions have declined considerably, decreasing by more than 80 percent in Japan, Ireland, France and Austria. Deaths as a result of infectious and respiratory diseases have reached low levels in almost all countries, except those with generally higher levels of infant mortality, such as the southern and eastern European countries.

Age and cause of death, which are clearly associated, were examined jointly for each country in 1960 and 1987. The 1960 analysis revealed two outlying groups of countries. The first group has a higher-than-average frequency of deaths due to perinatal conditions between seven and 28 days of life and a higher frequency of deaths due to respiratory system diseases and "other conditions" from 28 days

to one year. These countries are Poland, Bulgaria and Greece, which had high mortality rates for this period. In the second group—the United States, Canada, the Netherlands, and England and Wales—most deaths occurred in the first week of life, as a result of congenital anomalies and perinatal conditions. These countries generally had low rates of infant mortality.

The analysis for 1987 reveals several changes. In Romania and Bulgaria, countries with relatively high levels of infant mortality, most deaths occur in the time periods beyond the first week of life, and respiratory system diseases cause death more frequently in these countries than in others. There is also a large group of countries—Australia, New Zealand, Norway, West Germany, Belgium and France—that have low infant mortality but are characterized by high frequencies of deaths occurring in postneonatal periods from ill-defined conditions and perinatal causes. A third group, consisting of Italy, Portugal, Greece, Poland, Hungary and Czechoslovakia, has a high frequency of deaths in the first week of life from perinatal causes.

Although all the countries in the study were classified as developed countries, there is nonetheless considerable diversity among them, to which the author attributes continued differences in infant mortality rates. Nonetheless, most have achieved lower levels of infant mortality than were thought possible 30 years ago, largely because of advances in perinatal medicine during the 1970s.—R. Turner

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U.S. Maternal Mortality Has Continued Its Decline, But Risk Remains Higher Among Minority Women

Maternal mortality in the United States and Puerto Rico decreased from about 11 deaths per 100,000 live births in 1979 to about seven deaths per 100,000 in 1986, according to an analysis of maternal deaths reported to the Centers for Disease Control (CDC).¹ During that period, the ratio for white women decreased from seven deaths to five deaths per 100,000 live births, while the ratio for black women and women of other minority races declined from about 27 to fewer than 17 deaths per 100,000 live births. The four leading causes of maternal death following delivery of a live infant were pulmonary embolism, pregnancy-induced hypertension, hemorrhage and infection. Following a stillbirth, the most common causes of death were

hemorrhage, pregnancy-induced hypertension and pulmonary embolism.

Health departments in all 50 states, the District of Columbia, New York City and Puerto Rico reported a total of 2,726 maternal deaths to the CDC for the period 1979-1986. Deaths were defined as maternal if they occurred during pregnancy or within one year after pregnancy resolution, and if they resulted from complications of pregnancy, from a series of events initiated by the pregnancy or from aggravation of an unrelated condition by the physiologic effects of the pregnancy. After reviewing death certificates and, when available, linked birth certificates and fetal death records, the investigators determined that 82 of the reported deaths were

not maternal deaths. The remaining 2,644 maternal deaths were categorized by immediate cause of death, associated conditions and outcome of pregnancy. Maternal mortality ratios (maternal deaths per 100,000 live births) were calculated using data on live births from the National Center for Health Statistics; they were then adjusted for marital status and parity (as measured by live-birth order).

More than half (52 percent) of the maternal deaths occurred after live births, 13 percent were associated with ectopic pregnancies, 10 percent followed stillbirths, six percent occurred before delivery, five percent were related to spontaneous or induced abortions (legal or illegal) and one-half of one percent were associated with

molar pregnancy; the outcomes of 15 percent of the pregnancies were unknown. The investigators were able to determine the interval between pregnancy resolution and maternal death for 97 percent of the cases associated with live birth or stillbirth, but could do so for only 21 percent of those related to abortion or ectopic pregnancy. Sixty-nine percent of all maternal deaths occurred during pregnancy or within a week after pregnancy resolution, 25 percent occurred from eight to 42 days after resolution and the remainder occurred from 43 to 365 days after resolution.

Overall, the maternal mortality ratio for 1979-1986 was 9.1 deaths per 100,000 live births; the annual ratio dropped from 10.9 deaths per 100,000 live births in 1979 to 7.4 per 100,000 in 1986. During that period, the maternal mortality ratio among white women decreased from 7.1 to 5.1 deaths per 100,000 live births, while among black and other minority women it dropped from 27.2 deaths per 100,000 to 16.6 per 100,000. In every year of the study period, the maternal mortality ratio for black and other minority women was considerably higher than the ratio for white women—from 1.5 to 2.8 times higher. Age-specific maternal mortality ratios were also higher among black and other minority women than among white women. Ratios increased with age in both racial groups, and were highest for women who were 40 or older.

Unmarried women were much more likely than married women to die from maternal causes (20.7 deaths vs. 7.1 deaths per 100,000 live births). Among whites, the age-adjusted ratio for unmarried women was 2.7 times the ratio for married women; among blacks, the age-adjusted ratio for unmarried women was only 1.2 times the ratio for married women (24.7 deaths per 100,000 live births vs. 20.5 per 100,000). Among women who died following a live birth, the age-adjusted ratio declined from 5.8 per 100,000 births among those delivering their first child to 4.1 among those having their second child; the ratio then increased with birth order.

Using a new classification system that distinguished among causes of death, related obstetric and medical conditions, and outcomes of pregnancy, the investigators determined that the leading causes of death following a live birth were pulmonary embolism (27 percent), pregnancy-induced hypertension (23 percent), hemorrhage (18 percent) and infection (seven percent). The leading causes of death following a stillbirth were hemorrhage (34 percent), pregnancy-induced hypertension

(22 percent) and pulmonary embolism (18 percent). When all maternal deaths were considered together, hemorrhage was the leading cause, followed by pulmonary embolism, pregnancy-induced hypertension, and infection. All cause-specific maternal mortality ratios declined over the course of the study period.

Because maternal death ratios have fallen sharply over the last 50 years, maternal mortality review committees in many states have been disbanded. Despite the decrease, the investigators argue, "a mechanism is needed for monitoring trends and occurrences of maternal mortality, understanding causes of and risk factors for maternal death, identifying areas amenable to intervention, and providing a benchmark against which the safety of existing and developing methods of pregnancy management can be compared."—*F. Althaus*

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Pill's Effect on Levels Of Serum Cholesterol Varies by Formulation

While combined low-dose estrogen pills do not affect overall serum cholesterol levels, they have a varied effect on cholesterol components, depending on the type and dose of progestin, according to a recent study of metabolic effects.¹ Compared with nonusers, women taking levonorgestrel-containing oral contraceptives have a 5-16 percent reduction in high-density lipoprotein (HDL) cholesterol levels. In contrast, pills containing desogestrel and those containing a low dose of norethindrone increase HDL cholesterol levels by 12 and 10 percent, respectively. Low-density lipoprotein (LDL) cholesterol levels are lower among women using a desogestrel-containing pill and those using a low-dose norethindrone pill than they are among nonusers of oral contraceptives. Low levels of HDL cholesterol and high levels of LDL cholesterol are risk factors for coronary heart disease.

Because of concern that the progestin components of oral contraceptives can increase the risk of coronary heart disease through metabolic changes, researchers in London studied the effects of modifications in the type or dose of progestin contained in oral contraceptive formulations on lipid and carbohydrate metabolism. For

the study, they recruited white women aged 18-45 who were within 20 percent of ideal body weight from clients of family planning clinics and general practitioners. The women were informed of the study by the physicians and were asked to contact the researchers themselves if they were interested in taking part. Participants could not have any known medical conditions, be taking medications known to affect lipid or carbohydrate metabolism or have been pregnant in the previous six months.

Women were classified as oral contraceptive users if they had been taking the pill for at least three months, and as nonusers if they had not taken any sex hormones for at least three months. To be eligible for the study, pill users must have been taking a monophasic or triphasic formulation with 30-40 mcg of ethinyl estradiol or a progestin-only formulation.* The analysis included 1,060 users and 418 nonusers. Results were standardized for several independent variables such as age and number of pregnancies.

The results of a series of metabolic tests conducted at set points in the pill cycle or menstrual cycle established that oral contraceptive use did not affect serum total cholesterol levels. However, ethinyl estradiol is known to increase serum triglyceride levels, which were significantly higher among users of all combined formulations than among nonusers. The increase was greater among users of monophasic pills containing norethindrone (67-71 percent) or desogestrel (75 percent) than among users of monophasics containing levonorgestrel (13-37 percent). Although the association of serum triglyceride levels with coronary heart disease is uncertain, raised levels are not thought to be a risk factor if HDL levels are high as well.

Levels of LDL cholesterol, which when raised are apparently associated with coronary heart disease, were significantly affected only by oral contraceptives containing 500 mcg of norethindrone or 150 mcg of desogestrel: Both of these monophasic formulations reduced LDL levels of cholesterol (by 12 percent and 14 percent, respectively). However, all combination pills containing levonorgestrel increased serum

*Because they were studying the effects of the progestin in oral contraceptives, the investigators wanted the estrogen dose and type to vary as little as possible. Of the nine types of oral contraceptives studied, seven contained ethinyl estradiol and one of the following progestins: levonorgestrel in low (150 mcg), high (250 mcg) and triphasic (50-125 mcg) doses; norethindrone in low (500 mcg), high (1,000 mcg) and triphasic (500-1,000 mcg) doses; and desogestrel in one dose (150 mcg). Two progestin-only formulations contained either levonorgestrel or norethindrone.

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levels of apolipoprotein B, the protein component of LDL, by 10–14 percent.

Although ethinyl estradiol raised HDL cholesterol levels, levonorgestrel monophasics and the high-dose norethindrone monophasic significantly reduced these levels: HDL levels among users of pills with 250 mcg of levonorgestrel were 16 percent lower than levels among nonusers, and levels among users of pills with 150 mcg of levonorgestrel were five percent lower than those among nonusers. Triphasic containing levonorgestrel had no effect on HDL cholesterol levels. Monophasic oral contraceptives containing 500 mcg of norethindrone or 150 mcg of desogestrel raised HDL cholesterol levels 10 percent and 12 percent, respectively.

The investigators also measured levels of two subclasses of HDL cholesterol—HDL₂ and HDL₃. The combined pills containing levonorgestrel all decreased HDL₂ levels, with the highest dose (250 mcg) effecting the greatest proportional decrease (43 percent). The high-dose norethindrone-containing monophasic (1,000 mcg) also significantly decreased HDL₂ levels (28 percent). However, users of all combined pills except the high-dose levonorgestrel monophasic had significantly higher levels of HDL₃ cholesterol than nonusers of oral contraceptives.

The protein components of HDL, apolipoproteins A-I and A-II, were increased by all the combined formulations except the high-dose levonorgestrel monophasic, which decreased A-I levels. A-I and A-II levels were not affected by levonorgestrel-only pills, but were decreased by norethindrone-only formulations.

Fasting plasma glucose levels were reduced somewhat among users of the low-dose levonorgestrel monophasic and the norethindrone triphasic, while fasting levels of insulin and C peptide were generally increased by all combined oral contraceptives. Three-quarters of the subjects (782 users and 346 nonusers) were given an oral glucose tolerance test to measure changes in glucose, insulin and C-peptide metabolism. Reduced glucose tolerance is associated with an increased risk of coronary heart disease in women. In general, combined pills significantly increased responses to the glucose tolerance test by glucose, insulin and C peptides.

The investigators note that the pro-

gestin-only formulations studied rarely had significant effects on carbohydrate metabolism, but "even at the low doses in current use, progestins may have unwanted metabolic side effects when combined with estrogen." They point out, however, that the effects vary greatly according to the type and dose of progestin used. For example, users of high-dose levonorgestrel formulations are apparently at greatest risk for experiencing metabolic changes associated with coronary heart disease, while users of desogestrel and low-dose norethindrone pills are at lowest risk. Therefore, changing the type and dose of progestin "can bring about a substantial reduction in risk markers for coronary heart disease" among women using pills containing low-dose estrogen.—P. Rind

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Use of Barrier Methods With Spermicides May Increase Vaginal Flora

Women are likely to have increased levels of *Escherichia coli* in their vagina and in their urine several hours after intercourse; the presence of *E. coli* in the vaginal area can lead to urinary tract infection. Women who use barrier methods with spermicides are far more likely than pill users to have higher levels of *E. coli* several hours after intercourse than they had prior to intercourse. In addition, a study of about 100 college students in Washington found that the prevalence among oral contraceptive users of *E. coli* presence in the vagina and urine was similar about 36 hours following intercourse to that at baseline, while the prevalence among diaphragm and condom users remained high.¹

Researchers at the University of Washington in Seattle studied the presence of *E. coli* bacteriuria and vaginal colonization among users of the pill, the diaphragm (with spermicidal jelly) and the condom (with spermicidal foam). Women interested in participating in the study were asked to abstain from intercourse for five days prior to its beginning. On the day of enrollment, they were screened for a variety of infections and behaviors. A total of 104 women were accepted into the study, all of them students at the university. Thirty-four were pill users, 32 were condom-foam users and 36 were diaphragm-jelly users. Those who usually used the

condom were provided with spermicidal foam, and those who usually used the diaphragm were given spermicidal jelly. All the participants were asked to have intercourse with their regular partner using their usual method between 8 P.M. and 12 A.M. that night. (Those who were unable to were rescheduled.) The next morning, the participants delivered a specimen of their first postcoital urine and were asked a series of questions regarding timing, duration and type of intercourse, timing of first postintercourse urination and timing of diaphragm insertion and removal. At that visit and at a third visit one day later, a midstream urine specimen was taken and a pelvic exam was performed. The participants were asked not to have intercourse between their second and third visits.

Although the three groups of women were similar according to background variables, diaphragm users were older and more likely to have been married or pregnant, and condom users had used their method for a shorter period. The only significant difference in intercourse-related behavior (during the night under study) was that, on average, diaphragm users had waited longer between intercourse and urination than had the other women.

At baseline, nine percent of pill users, six percent of condom users and five percent of diaphragm users were found to have *E. coli* bacteriuria (defined as at least 10² colony-forming units of *E. coli* per milliliter present in their midstream urine). By the second visit, the proportion of women with *E. coli* bacteriuria had increased in all three groups. Although the increase was not statistically significant among pill users, it was significant among condom users ($p=.008$) and diaphragm users ($p<.0001$). By the third visit, the proportion of oral contraceptive users with *E. coli* bacteriuria was similar to that at baseline. Among diaphragm and condom users, however, there were still significantly higher proportions of women with *E. coli* bacteriuria than at baseline ($p<.005$). Among 28 women in each group who did not have *E. coli* bacteriuria or vaginal colonization at baseline, two pill users (seven percent), eight condom users (29 percent) and 14 diaphragm users (50 percent) had *E. coli* bacteriuria at a postintercourse visit.

The proportion of women with *E. coli* vaginal colonization also increased in all three groups following intercourse. At baseline, 15 percent of pill users, nine percent of condom users and 26 percent of diaphragm users were found to have vaginal colonization. The increase in prevalence among diaphragm users reached a

high level of statistical significance ($p=.0002$); the increases among condom users and pill users were significant, but at a lower level ($p=.001$ and $p=.03$, respectively). At the third visit, the proportions of condom users and diaphragm users with colonization were similar to those at the second visit. Among oral contraceptive users, however, the prevalence had returned nearly to that at baseline. Of 86 women who did not have vaginal colonization with *E. coli* at baseline, 11 of 29 pill users (38 percent), 13 of 29 condom users (45 percent) and 17 of 28 diaphragm users (61 percent) had *E. coli* vaginal colonization by the second or third visit. Heavy vaginal colonization was most prevalent among diaphragm users.

Among pill users who did not have *E. coli* bacteriuria at the baseline visit, *E. coli*

bacteriuria was apparently associated with the length of the interval between intercourse and first postcoital urination. Twenty oral contraceptive users had urinated within one hour after intercourse, and none were found to have *E. coli* bacteriuria at either postintercourse visit; in contrast, three of 11 pill users (27 percent) who had urinated more than one hour after intercourse developed *E. coli* bacteriuria. No such association was observed in the other two groups.

The researchers acknowledge that although their study "provides the most convincing evidence to date that sexual intercourse causes bacteriuria and vaginal colonization with *E. coli*," they do not know why diaphragm-spermicide users are at far greater risk than oral contraceptive users. They hypothesize that the spermicide

is the key factor, since users of condoms and foam are also at greater risk than pill users. However, the investigators do not know the mechanism by which *E. coli* appears in the vagina and urine, or whether the diaphragm somehow induces the flora to remain longer than they otherwise would. They point out that as the use of both the diaphragm and the condom is likely to increase in the United States over the next decade because of their effectiveness in protecting against sexually transmitted diseases, prospective studies expanding on this research are necessary to help decrease women's risk of developing urinary tract infection.—P. Rind

Reference

1. T. M. Hooton et al., "Escherichia coli Bacteriuria and Contraceptive Method," *Journal of the American Medical Association*, 265:64, 1991.

No Biological Association Found Between Sterilization and Subsequent Hysterectomy

Tubal sterilization is not independently associated with a risk of subsequent hysterectomy, according to a study conducted by the Group Health Cooperative of Puget Sound and the University of Washington.¹ Among women aged 20–49 who had had a tubal sterilization at some time during the 15 years prior to the study, those sterilized between the ages of 20 and 29 were three times more likely to have had a subsequent hysterectomy than was a population-based comparison cohort, with risk decreasing as current age increased. However, women sterilized at age 20–29, when compared with wives of vasectomized men, showed no elevated risk of hysterectomy; nor was hysterectomy associated with sterilization among married women sterilized at age 30 or older. Although there may be no biological link between sterilization and hysterectomy, for some groups of sterilized women, medical decisions made in the years following a sterilization might increase the risk of hysterectomy.

The Group Health Cooperative of Puget Sound (GHC), a nonprofit health maintenance organization in western Washington, offers medical services—including contraception and sterilization—to approximately 350,000 people. Using the GHC's database of past and present clients, the researchers identified 7,414 women who were sterilized at a GHC facility be-

tween January 1, 1968, and December 31, 1983, and who were between the ages of 20 and 49 at the time of sterilization. The researchers then set up a comparison cohort of 25,736 women from among GHC patients, attempting to match each sterilized woman with up to four nonsterilized women, according to birth date and year of first enrollment at GHC. A second comparison group consisted of 5,323 women whose husbands were vasectomized at a GHC facility between January 1, 1968, and December 31, 1983; only married sterilized women were compared with this group.

Seventy-one percent of the tubal sterilization patients were women aged 30 and older at the time of the procedure; six percent were aged 20–24 and 23 percent were aged 25–29. Compared with the population-based cohort, sterilized women were 1.6 times as likely to have had a subsequent hysterectomy. This risk declined sharply as age increased: Women sterilized at age 20–29 were 3.4 times as likely to have undergone a subsequent hysterectomy, while those sterilized at 30–34 were 1.5 times as likely, those sterilized at 35–44 were 1.2–1.3 times as likely and those sterilized at 45–49 were 0.9 times as likely to have required a later hysterectomy.

A multivariate analysis was performed to control for the effects of marital status, parity, contraceptive method used, prior pelvic abnormality, prior menstrual disorder, race, cigarette smoking, number of visits in the prior two years, age, tenure in GHC and year of sterilization.* Controlling for these variables did not change the

relative risk of subsequent hysterectomy.

The multivariate analysis did reveal that among women sterilized at age 30 and older, the risk of hysterectomy was limited to those unmarried at the time of sterilization. Among the 30 unmarried sterilized women in the analysis, 24 had had hysterectomies, compared with only three of the 11 unmarried women in the population-based cohort (a relative risk of 17.2). Married women sterilized after age 30 were found to have no elevated risk of subsequent hysterectomy (a relative risk of 0.6).

A comparison with the wives of vasectomized men initially showed that currently married sterilized women were apparently more likely to have had a subsequent hysterectomy (a relative risk of 1.4), but a multivariate analysis controlling for the above factors removed this risk. Among the wives of vasectomized men, the risk of hysterectomy after sterilization did not vary significantly by age at the time of sterilization. Further comparison with the spousal cohort showed no significant differences in the risk of hysterectomy according to method of sterilization. In fact, the sterilization technique that causes the most damage to the tubal tissue near the ovary—unipolar coagulation—was found not to result in a higher risk of hysterectomy (a relative risk of 1.3). A multivariate analysis did not alter these findings.

It has been hypothesized that tubal sterilization increases the risk of hysterectomy by disrupting ovarian blood flow, affecting nerve cells in the fallopian tube or ovary, or contorting the tube or ovary. The

*For population-based controls, this was the year their match in the sterilization cohort was sterilized, and for wives of vasectomized men it was the year of their husband's vasectomy.

DIGEST

most common indications for hysterectomy among sterilized participants were dysfunctional uterine bleeding (23 per 100 women) and pelvic relaxation (10 per 100 women).^{*} Among nonsterilized women, more than half of the hysterectomies were for benign tumors (18 per 100 women) and carcinoma (four per 100 women). Sterilized women were two percent less likely to report a benign tumor as an indication for their hysterectomy; there was no difference between the two groups in the likelihood of cancer as an indication.

Thus, women sterilized between ages 20-29 were more likely to have a later hysterectomy than were women of this age in the population-based cohort, but there was no difference in the risk of hysterectomy between young sterilized women and the wives of vasectomized men. This suggests that among these two groups, similar characteristics may influence risk. The researchers point out that once a woman has decided to stop childbearing and either she or her husband is sterilized, she or her doctor, or both, may be more likely to choose hysterectomy to manage a gynecologic problem. They also note that oral contraceptive use among those in the population-based comparison group might have lessened their incidence of menstrual problems, and in turn decreased their chances of requiring hysterectomy for the treatment of these disorders.—R. Turner

Reference

1. A. Stergachis et al., "Tubal Sterilization and the Long-term Risk of Hysterectomy," *Journal of the American Medical Association*, 264:2893, 1990.

^{*}Denominator is 138 sterilized women and 138 women from the population-based cohort.

Users of Hormonal IUD Have Lower Pregnancy Rate, More Side Effects

Women using a levonorgestrel-releasing IUD had lower rates of pelvic inflammatory disease than did women using a copper-releasing IUD.¹ A European study involving nearly 2,800 women also showed that pregnancy rates among users of the hormonal IUD were significantly lower than among users of the copper IUD; but those using the hormonal IUD were more likely than the others to experience amenorrhea and other hormonal side effects.

A three-year investigation by the International Study Group on Levonorgestrel-Releasing Intrauterine Device compared an IUD that releases 20 mcg of levonorgestrel a day with a copper-releasing IUD, the Nova-T. The research took place in 14 clinics in Denmark, Finland, Hungary, Norway and Sweden. A total of 2,758 subjects were randomized into two groups, with 937 women using the Nova-T and 1,821 women using the hormonal IUD. (The 2:1 ratio afforded a closer look at any side effects produced by the hormonal IUD.) IUDs were inserted within 10 days of the start of menstrual bleeding, or immediately after a first-trimester vacuum-aspiration abortion. There were no significant differences between the two groups in age or parity distribution. Approximately 15 percent of the women in each group were under 25 years old; half of those in each group had had two children, and eight percent in the Nova-T group and seven percent in the hormonal IUD group had had no children.

Pelvic inflammatory disease (PID) was diagnosed if at least two of the following symptoms were present: history of lower abdominal pain and increased body temperature, increased erythrocyte sedimentation rate, tenderness or mass at pelvic examination, and evidence found with ultrasound or laparoscopy. Over the three-year study period, 351 women stopped using the Nova-T and 749 stopped using the hormonal IUD; discontinuations because of PID occurred in two percent of the Nova-T users and 0.5 percent of the hormonal IUD users. This difference was most marked among those under 25 years of age—the group most at risk for PID.

Among Nova-T users, 24 discontinued because of accidental pregnancy, compared with three among hormonal IUD users. Of pregnancies among users of the hormonal IUD, one occurred during the 10th month of use after an undetected expulsion, one during the 23rd month and one (an ectopic pregnancy) during the 30th month. There were five ectopic pregnancies among Nova-T users. (Two of these, as well as the only ectopic pregnancy among users of the hormonal IUD, occurred in one clinic, where 66 Nova-T and 125 hormonal IUDs were inserted.) Thus, the pregnancy rate associated with use of the Nova-T was 3.7 per 100 woman-years of use, while the rate for the hormonal IUD was 0.3 per 100; the respective rates of ectopic pregnancy were 0.25 and 0.03 per 100, a statistically significant difference.

Equal numbers of women in each group discontinued IUD use because of expul-

sion (five percent) or pain (four percent). There were no significant differences between rates of discontinuation for planning a pregnancy (10 percent of Nova-T users and 11 percent of hormonal IUD users), for other medical reasons (seven percent and six percent) or for personal reasons (two percent and three percent).

Discontinuation because of bleeding problems was more common among Nova-T users (14 percent) than among hormonal IUD users (11 percent). On the other hand, women using the hormonal IUD were far more likely to encounter side effects specific to the use of a hormonal method: Five percent experienced amenorrhea, while none of the Nova-T users did. Furthermore, 62 users of the hormonal IUD discontinued because of oligomenorrhea but, again, none of the Nova-T users did. Removals for oligomenorrhea were done at the woman's request or the doctor's judgment, and more than half took place in one clinic where 366 hormonal IUDs were inserted. Discontinuation for this reason does not necessarily represent a true measure of the incidence of oligomenorrhea; rather, it indicates that the bleeding problem was disturbing enough to the women or her doctor to prompt a removal. The investigators suggest that intensive counseling may reduce discontinuations for this condition.

Other typically hormone-related problems were reported by eight percent of hormonal IUD users and only one percent of Nova-T users. Small proportions of women using the hormonal IUD reported depression (two percent), acne, weight change or headache (one percent each), and other mood changes, nausea, breast tenderness, other skin problems or unwanted hair growth (each less than one percent). Such problems were less frequent among Nova-T users: Fewer than one percent each complained of nausea, acne, headaches or other mood changes.

The researchers note that IUD users with no signs of PID usually have a cervical bacterial flora rich in microorganisms, and that these are similar regardless of whether they use a copper or a hormonal device. Thus, any protective effect of the hormonal IUD against PID may be a result of thickened cervical mucus, suppressed endometrial growth, or a reduction in menstrual bleeding.—R. Turner

Reference

1. J. Toivonen, T. Luukkainen and H. Allonen, "Protective Effect of Intrauterine Release of Levonorgestrel on Pelvic Infection: Three Years' Comparative Experience of Levonorgestrel and Copper-Releasing Intrauterine Devices," *Obstetrics and Gynecology*, 77:261, 1991.

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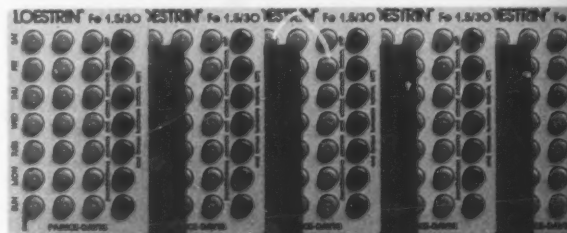
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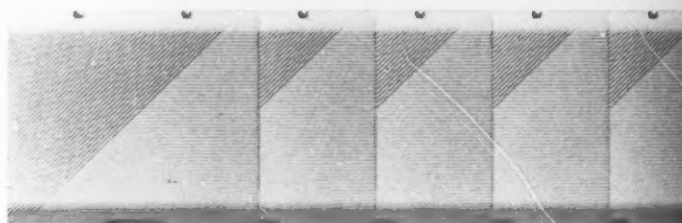
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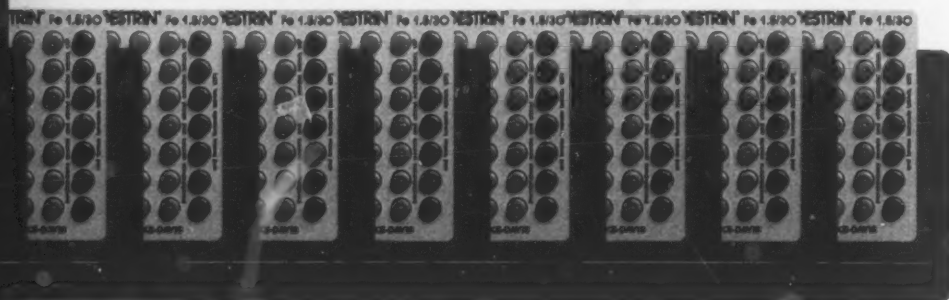
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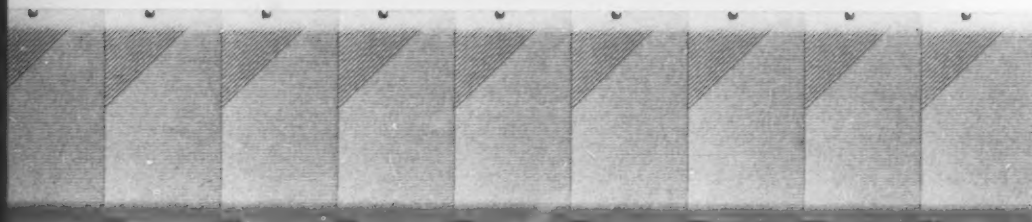
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Before prescribing, please see full prescribing information. A Brief Summary follows:

INDICATIONS AND USAGE: Loestrin 21 and Loestrin 21 are indicated for the prevention of pregnancy in women who elect to use oral contraceptives (OCs) as a method of contraception.

CONTRAINDICATIONS: OCs should not be used in women who currently have the following conditions:

- Thrombophlebitis or thromboembolic disorders.
- A past history of deep vein thrombophlebitis or thromboembolic disorders.
- Cerebral vascular or coronary artery disease.
- Known or suspected carcinoma of the breast.
- Carcinoma of the endometrium or other known or suspected estrogen dependent neoplasia.
- Undiagnosed abnormal genital bleeding.
- Cholestatic jaundice of pregnancy or jaundice with prior pill use.
- Hepatic adenomas or carcinomas.
- Known or suspected pregnancy.

WARNINGS

Cigarette smoking increases the risk of serious cardiovascular side effects from oral contraceptive use. This risk increases with age and with heavy smoking (15 or more cigarettes per day) and is quite marked in women over 35 years of age. Women who use oral contraceptives should be strongly advised not to smoke.

The use of OCs is associated with increased risks of several serious conditions including myocardial infarction, thromboembolism, stroke, hepatic neoplasia, and gallbladder disease, although the risk of serious morbidity or mortality is very small in healthy women without underlying risk factors. The risk of morbidity and mortality increases significantly in the presence of other underlying risk factors such as hypertension, hyperlipidemias, obesity and diabetes. Practitioners prescribing OCs should be familiar with the following information relating to these risks. The information contained in the package insert is principally based on studies carried out in patients who used OCs with higher formulations of estrogens and progestogens than those in common use today. The effect of long-term use of the OCs with lower formulations of both estrogens and progestogens remains to be determined. Throughout this labeling, epidemiological studies reported are of two types: retrospective or case control studies and prospective or cohort studies. Case control studies provide a measure of the relative risk of a disease, namely, a ratio of the incidence of a disease among OC users to that among nonusers. The relative risk does not provide information on the actual clinical occurrence of a disease. Cohort studies provide a measure of attributable risk, which is the difference in the incidence of disease between OC users and nonusers. The attributable risk does provide information about the actual occurrence of a disease in the population. For further information, the reader is referred to a text on epidemiological methods.

1. Thromboembolic Disorders and Other Vascular Problems:

a. Myocardial Infarction: An increased risk of myocardial infarction has been attributed to OC use. This risk is primarily in smokers or women with other underlying risk factors for coronary artery disease such as hypertension, hypercholesterolemia, morbid obesity, and diabetes. The relative risk of heart attack for current OC users has been estimated to be two to six. The risk is very low under the age of 30. Smoking in combination with OC use has been shown to contribute substantially to the incidence of myocardial infarction in women in their mid-thirties or older with smoking accounting for the majority of excess cases. Mortality rates associated with circulatory disease have been shown to increase substantially in smokers over the age of 35 and nonsmokers over the age of 40 among women who use OCs. OCs may compound the effects of well-known risk factors, such as hypertension, diabetes, hyperlipidemias, age and obesity. In particular, some progestogens are known to increase HDL cholesterol and cause glucose intolerance, while estrogens may create a state of hyperinsulinism. OCs have been shown to increase blood pressure among users (see section 9 in WARNINGS). Similar effects on risk factors have been associated with an increased risk of heart disease. OCs must be used with caution in women with cardiovascular disease risk factors.

b. Thromboembolism: An increased risk of thromboembolic and thrombotic disease associated with the use of OCs is well established. Case control studies have found the relative risk of users compared to nonusers to be 3 for the first episode of superficial venous thrombosis, 4 to 11 for deep vein thrombosis or pulmonary embolism, and 1.5 to 6 for women with predisposing conditions for venous thromboembolic disease. Cohort studies have shown the relative risk to be somewhat lower, about 3 for new cases and about 4.5 for new cases requiring hospitalization. The risk of thromboembolic disease due to OCs is not related to length of use and disappears after pill use is stopped. A two- to four-fold increase in relative risk of postoperative thromboembolic complications has been reported with the use of OCs. The relative risk of venous thrombosis in women who have predisposing conditions is twice that of women without such medical conditions. If feasible, OCs should be discontinued at least four weeks prior to and for two weeks after elective surgery of a type associated with an increase in risk of thromboembolism and during and following prolonged immobilization. Since the immediate postpartum period is also associated with an increased risk of thromboembolism, OCs should be started no earlier than four to six weeks after delivery in women who elect not to breast-feed.

c. Cerebrovascular Diseases: OCs have been shown to increase both the relative and attributable risks of cerebrovascular events (thrombotic and hemorrhagic strokes), although in general the risk is smaller (or <15 years), hypertension, hyperlipidemia, women who also smoke. Hypertension was found to be a risk factor for both users and nonusers, for both types of strokes, while smoking interacted to increase the risk for hemorrhagic strokes. In a large study, the relative risk of thrombotic strokes has been shown to range from 3 for nonusers to 14 for users with severe hypertension. The relative risk of hemorrhagic stroke is reported to be 1.2 for nonsmokers who used OCs, 2.6 for smokers who did not use OCs, 7.6 for smokers who used OCs, 1.8 for nonusers and 2.7 for users with severe hypertension. The attributable risk is also greater in older women.

d. Dose-related risk of vascular disease from OCs: A positive association has been observed between the amount of estrogen and progestogen in OCs and the risk of vascular disease. A decline in serum high-density lipoproteins (HDL) has been reported with many progestational agents. A decline in serum high-density lipoproteins has been associated with an increased incidence of ischemic heart disease. Because estrogens increase HDL cholesterol, the net effect of an OC depends on a balance achieved between doses of estrogen and progestogen and the nature and absolute amount of progestogens used in the contraceptives. The amount of both hormones should be considered in the choice of an OC. Minimizing exposure to estrogen and progestogen is in keeping with good principles of therapeutics. For any particular estrogen/progestogen combination, the dosage regimen prescribed should be one which contains the least amount of estrogen and progestogen that is compatible with a low failure rate and the needs of the individual patient. New acceptors of OC agents should be started on preparations containing the lowest dose of estrogen which produces satisfactory results for the patient.

e. Persistence of risk of vascular disease: There are two studies which have shown persistence of risk of vascular disease for ever users of OCs. In a study in the United States, the risk of developing myocardial infarction after discontinuing OCs persists for at least 9 years for women 40-49 years who had used OCs for 5 or more years, but this increased risk was not demonstrated in other age groups. In another study in Great Britain, the risk of developing cerebrovascular disease persisted for at least 6 years after discontinuation of OCs, although excess risk was very small. However, both studies were performed with OC formulations containing 50 micrograms or higher of estrogen.

2. Estimates of Mortality from Contraceptive Use: One study gathered data from a variety of sources which have estimated the mortality rate associated with different methods of contraception at different ages. These estimates include the combined risk of death associated with contraceptive methods plus the risk attributable to pregnancy in the event of method failure. Each method of contraception has its specific benefits and risks. The study concluded that with the exception of OC users 35 and older who smoke and 40 and older who do not smoke, mortality associated with all methods of birth control is low and below that associated with childbirth. The observation of a possible increase in risk of mortality with age for OC users is based on data gathered in the 1970's - but not reported until 1983. However, current clinical practice involves the use of lower estrogen dose formulations combined with careful restriction of OC use to women who do not have the various risk factors listed in this labeling. Because of these changes in practice and, also, because of some limited new data which suggest that the risk of cardiovascular disease with the use of OCs may now be less than previously observed (Porter JB, Hunter J, Jack H, et al. Oral contraceptives and nonfatal vascular disease. *Obstet Gynecol* 1985;66:1-4 and Porter JB, Hershel J, Walker AM. Mortality among oral contraceptive users. *Obstet Gynecol* 1987;70:29-32), the Fertility and Maternal Health Drugs Advisory Committee was asked to review the topic in 1989. The Committee concluded that although cardiovascular disease risks may be increased with OC use after age 40 in healthy nonsmoking women (even with the newer low-dose formulations), there are greater potential health risks associated with pregnancy in older women and with the alternative surgical and medical procedures which may be necessary if such women do not have access to effective and acceptable means of contraception. Therefore, the Committee recommended that the benefits of OC use by healthy nonsmoking women over 40 may outweigh the possible risks. Of course older women, as all women who take OCs, should take the lowest possible dose formulation that is effective.

3. Carcinoma of the Reproductive Organs: Numerous epidemiological studies have been performed on the incidence of breast, endometrial, ovarian and cervical cancer in women using OCs. Most of the studies on breast cancer and OC use report that the use of OCs is not associated with an increase in the risk of developing breast cancer. Some studies have reported an increased risk of developing breast cancer in certain subgroups of OC users but the findings reported in these studies are not consistent. Some studies suggest that OC use has been associated with an increase in the risk of cervical intraepithelial neoplasia in some populations of women. However, there continues to be controversy about the extent to which such findings may be due to differences in sexual behavior and other factors. In spite of many studies of the relationship between OC use and breast and cervical cancers, a cause and effect relationship has not been established.

4. Hepatic Neoplasia: Benign hepatic adenomas are associated with OC use, although the incidence of benign tumors is rare in the United States. Indirect calculations have estimated the attributable risk to be in the range of 3.3 cases/100,000 for users, a risk that increases after four or more years of use. Rupture of rare, benign, hepatic adenomas may cause death through intra-abdominal hemorrhage. Studies from Britain have shown an increased risk of developing hepatocellular carcinoma in long-term (>8 years) OC users. However, these cancers are extremely rare in the US, and the attributable risk (the excess incidence) of liver cancers in OC users approaches less than one per million users.

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5. Ocular Lesions: There have been clinical case reports of retinal thrombosis associated with the use of OCs. OCs should be discontinued if there is unexplained partial or complete loss of vision, onset of proptosis or diplopia, papilledema, or retinal vascular lesions. Appropriate diagnostic and therapeutic measures should be undertaken immediately.

6. OC Use Before or During Early Pregnancy: Extensive epidemiological studies have revealed no increased risk of birth defects in women who used OCs prior to pregnancy. Studies also do not suggest a teratogenic effect, particularly insofar as cardiac anomalies and limb reduction defects are concerned, when taken inadvertently during early pregnancy. The administration of OCs to induce withdrawal bleeding should not be used as a test for pregnancy. OCs should not be used during pregnancy to treat threatened or habitual abortion. It is recommended that for any patient who has missed two consecutive periods, pregnancy should be ruled out before continuing OC use. If the patient has not adhered to the prescribed schedule, the possibility of pregnancy should be considered at the time of the first missed period. OC use should be discontinued if pregnancy is confirmed.

7. Gallbladder Disease: Earlier studies have reported an increased lifetime relative risk of gallbladder surgery in users of OCs and estrogens. More recent studies, however, have shown that the relative risk of developing gallbladder disease among OC users may be minimal. The recent findings of minimal risk may be related to the use of OC formulations containing lower hormonal doses of estrogens and progestogens.

8. Carbohydrate and Lipid Metabolic Effects: OCs have been shown to cause glucose intolerance in a significant percentage of users. OCs containing greater than 75 micrograms of estrogens cause hyperinsulinism, while lower doses of estrogen cause less glucose intolerance. Progestogens increase insulin secretion and create insulin resistance, this effect varying with different progestational agents. However, in the nondiabetic woman, OCs appear to have no effect on fasting blood glucose. Because of these demonstrated effects, prediabetic and diabetic women should be carefully observed while taking OCs. A small proportion of women will have persistent hypertriglyceridemia while on the pill. As discussed earlier (see WARNINGS 1a and 1d), changes in serum triglycerides and lipoprotein levels have been reported in OC users.

9. Elevated Blood Pressure: An increase in blood pressure has been reported in women taking OCs, and this increase is more likely in older OC users and with continued use. Data from the Royal College of General Practitioners and subsequent randomized trials have shown that the incidence of hypertension increases with increasing concentrations of progestogens. Women with a history of hypertension or hypertension-related diseases, or renal disease, should be encouraged to use another method of contraception. If women elect to use OCs, they should be monitored closely and if significant elevation of blood pressure occurs, OCs should be discontinued. For most women, elevated blood pressure will return to normal after stopping OCs, and there is no difference in the occurrence of hypertension among ever and never users.

10. Headache: The onset or exacerbation of migraine or development of headache with a new pattern which is recurrent, persistent or severe requires discontinuation of OCs and evaluation of the cause.

11. Bleeding Irregularities: Breakthrough bleeding and spotting are sometimes encountered in patients on OCs, especially during the first three months of use. Nonhormonal causes should be considered and adequate diagnostic measures taken to rule out malignancy or pregnancy in the event of breakthrough bleeding, as in the case of any abnormal vaginal bleeding. If pathology has been excluded, time or a change to another formulation may solve the problem. In the event of amenorrhea, pregnancy should be ruled out. Some women may encounter postpill amenorrhea or oligomenorrhea, especially when such a condition was preexistent.

PRECAUTIONS

1. Physical Examination and Follow-Up: A complete medical history and physical examination should be taken prior to the initiation or reinstatement of OCs and at least annually during use of OCs. These physical examinations should include special reference to blood pressure, breasts, abdomen and pelvic organs, including cervical cytology, and relevant laboratory tests. In case of undiagnosed, persistent or recurrent abnormal vaginal bleeding, appropriate diagnostic measures should be conducted to rule out malignancy. Women with a strong family history of breast cancer or who have breast nodules should be monitored with particular care.

2. Lipid Disorders: Women who are being treated for hyperlipidemias should be followed closely if they elect to use OCs. Some progestogens may elevate LDL levels and may render the control of hyperlipidemias more difficult. **3. Liver Function:** If jaundice develops in any woman receiving such drugs, the medication should be discontinued. Steroid hormones may be poorly metabolized in patients with impaired liver function.

4. Fluid Retention: OCs may cause some degree of fluid retention. They should be prescribed with caution, and only with careful monitoring, in patients with conditions which might be aggravated by fluid retention.

5. Emotional Disorders: Women with a history of depression should be carefully observed and the drug discontinued if depression recurs to a serious degree.

6. Contact Lenses: Contact lens wearers who develop visual changes or changes in lens tolerance should be assessed by an ophthalmologist.

7. Drug Interactions: Reduced efficacy and increased incidence of breakthrough bleeding and menstrual irregularities have been associated with concomitant use of rifampin. A similar association, though less marked, has been suggested with barbiturates, phenylbutazone, phenytoin sodium, and possibly with griseofulvin, ampicillin and tetracyclines.

8. Interactions with Laboratory Tests: Certain endocrine and liver function tests and blood components may be affected by OCs:

- a. Increased prothrombin and factors VII, VIII, IX, and X, decreased antithrombin 3, increased norepinephrine-induced platelet aggregability.
- b. Increased thyroid binding globulin (TBG) leading to increased circulating total thyroid hormone, as measured by protein-bound iodine (PBI), T4 by column or by radioimmunoassay. Free T3 resin uptake is decreased, reflecting the elevated TBG; free T4 concentration is unaltered.
- c. Other binding proteins may be elevated in serum.
- d. Sex-binding globulins are increased and result in elevated levels of total circulating sex steroids and corticoids; however, free or biological active levels remain unchanged.
- e. Triglycerides may be increased.
- f. Glucose tolerance may be decreased.
- g. Serum folate levels may be depressed by OC therapy. This may be of clinical significance if a woman becomes pregnant shortly after discontinuing OCs.

9. Carcinogenesis: See WARNINGS section.

10. Pregnancy: Pregnancy Category X. See CONTRAINDICATIONS and WARNINGS sections.

11. Nursing Mothers: Small amounts of OC steroids have been identified in the milk of nursing mothers and a few adverse effects on the child have been reported, including jaundice and breast enlargement. In addition, OCs given in the postpartum period may interfere with lactation by decreasing the quantity and quality of breast milk. If possible, the nursing mother should be advised not to use OCs but to use other forms of contraception until she has completely weaned her child.

INFORMATION FOR THE PATIENT: See patient labeling.

ADVERSE REACTIONS: An increased risk of the following serious adverse reactions has been associated with the use of OCs (see WARNINGS section): Thrombophlebitis, arterial thromboembolism; pulmonary embolism; myocardial infarction; cerebral hemorrhage, cerebral thrombosis; hypertension; gallbladder disease; hepatic adenomas or benign liver tumors. There is evidence of an association between the following conditions and the use of OCs, although additional confirmatory studies are needed: Mesenteric thrombosis; retinal thrombosis. The following adverse reactions have been reported in patients receiving OCs and are believed to be drug-related: Nausea, vomiting; gastrointestinal symptoms (such as abdominal cramps and bloating); breakthrough bleeding, spotting, change in menstrual flow, amenorrhea, temporary infertility after discontinuance of treatment, edema, melasma which may persist; breast changes: tenderness, enlargement, secretion; change in weight (increase or decrease); change in cervical erosion and secretion; diminution in lactation when given immediately postpartum; cholestatic jaundice; migraine; rash (allergic); mental depression; reduced tolerance to carbohydrates; vaginal candidiasis; change in corneal curvature (steepening); intolerance to contact lenses. The following adverse reactions have been reported in users of OCs and the association has been neither confirmed nor refuted: Premenstrual syndrome, catarrhs; changes in appetite; cystitis like syndrome; headache; nervousness; dizziness; hirsutism; loss of scalp hair; erythema multiforme; erythema nodosum; hemorrhagic eruption; vaginitis; porphyria; impaired renal function; hemolytic uremic syndrome; Budd-Chiari syndrome; acne; changes in libido; colitis.

OVERDOSEAGE: Serious ill effects have not been reported following acute ingestion of large doses of OCs by young children. Overdose may cause nausea, and withdrawal bleeding may occur in females.

HOW SUPPLIED

Loestrin 21 120 is available in dispensers each containing 21 tablets. Each tablet contains 1 mg of norethindrone acetate and 20 mcg of ethinyl estradiol. Available in packages of five dispensers.

Loestrin 21 120 is available in dispensers each containing 21 white tablets and 7 brown tablets. Each white tablet contains 1 mg of norethindrone acetate and 20 mcg of ethinyl estradiol. Each brown tablet contains 75 mg ferrous fumarate. Available in packages of five dispensers.

Loestrin 21 15/30 is available in dispensers each containing 21 tablets. Each tablet contains 1.5 mg of norethindrone acetate and 30 mcg of ethinyl estradiol. Available in packages of five dispensers.

Loestrin 21 15/30 is available in dispensers each containing 21 green tablets and 7 brown tablets. Each green tablet contains 1.5 mg of norethindrone acetate and 30 mcg of ethinyl estradiol. Each brown tablet contains 75 mg ferrous fumarate. Available in packages of five dispensers.

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UPDATE

Unexpected Route to Infertility?

Women with infections of the upper genital tract appear to be at increased risk of developing antibodies to sperm, which suggests that autoimmune infertility may be an unexpected side effect of sexually transmitted infections.¹ Researchers recruited a group of 177 never-pregnant women aged 18-30 who had no history of autoimmune disease, previous gynecologic infections or prior abdominal or pelvic surgery, but who were diagnosed with either pelvic inflammatory disease (PID) or were infected with *Chlamydia trachomatis*, *Trichomonas vaginitis* or *Candida vaginitis*. These women were contrasted with 50 comparable sexually active women who had no genital tract infection. The study showed that 45-46 percent of those with PID and 16-19 percent of those infected with the various specific organisms had serum antibodies to sperm, compared with eight percent of controls. Similarly, 43-57 percent of those with PID and 12-22 percent of the other infected women but only four percent of controls had antisperm antibodies in their cervical mucus. The investigators note that while the exact relationship between antisperm antibody activity and reproductive events is unknown, "it is widely accepted that antisperm antibodies, whatever their cause(s), result in a diminished fertility capacity."

1. D. S. Cunningham et al., "Antisperm Antibodies to Sperm Surface Antigens in Women with Genital Tract Infection," *American Journal of Obstetrics and Gynecology*, 164:791, 1991.

Little Progress in Drug Approval

Between 1987 and 1989, the U.S. Food and Drug Administration (FDA) approved 55 new drugs that could be classified as new chemical entities, just one of them a contraceptive.¹ According to investigators who examined

these approvals, this total represented a "modest decrease" from the preceding three-year period. On average, the drugs were approved after a little more than eight years of review—five in the investigational new drug application phase and three in the new drug application phase. (The one contraceptive, a pill containing ethinyl estradiol and norgestimate, required a little less than three years to go through the latter phase.) Eighty percent of the drugs had already been marketed outside the United States (for an average of 6.5 years) before receiving FDA approval. The researchers conclude that the mean length of the approval process over the past decade suggests "no real improvement in new drug development and review times," but they add that "FDA efforts to streamline the development and review processes . . . are still new and will take time to implement. The effects of these changes may not be seen for several years."

1. K. I. Kaitin, P. A. DiCerbo and L. Lasagna, "The New Drug Approvals of 1987, 1988, and 1989: Trends in Drug Development," *Journal of Clinical Pharmacology*, 31:116, 1991.

Public Abortion Views Unchanged

Ninety-two percent of Americans believe that a pregnant woman should be able to obtain a legal abortion if her own health is endangered, 83 percent if there is a strong chance that the fetus has a serious defect and 86 percent if the woman became pregnant as a result of rape.¹ According to data from a 1991 survey conducted by the National Opinion Research Center, these percentages are among the highest recorded for these questions since they were first asked in 1965. Forty-eight percent said that a woman should be able to obtain a legal abortion if her family has a low income and cannot afford to raise another child, and 45 percent expressed agreement in the case of a pregnant unmarried woman who does not wish to marry or of a married woman who does not want

any more children. Forty-three percent said that a woman should be able to have a legal abortion for any reason. Most of these proportions have not changed over the last three years.

1. T. W. Smith, National Opinion Research Center, personal communication, July 9, 1991.

Is Promiscuity Less Condoned?

Over the past 25 years, the percentage of students at a southern university who believe that premarital intercourse is immoral has steadily dwindled, but the proportion who say that having a great many partners is immoral has risen in recent years.¹ In 1965, 70 percent of young women and 33 percent of young men surveyed in classes at the university agreed with the statement that premarital sexual intercourse is immoral; by 1985, only 17 percent of young women and 16 percent of young men agreed. However, among females, the proportion agreeing that a promiscuous man is immoral fell from 57 percent in 1965 to 30 percent in 1975 and then rose to 52 percent in 1985; the proportion saying this about a woman fell from 91 percent to 41 percent and then rose to 64 percent. Likewise, among males, the percentage agreeing that a man who has many partners is immoral fell from 35 percent in 1965 to 19 percent in 1975, but then rose to 32 percent by 1985; the percentage who thought this about a woman fell from 42 percent to 29 percent between 1965 and 1975, but rose to 51 percent in 1985. The investigators comment that with regard to having many partners, "there is a very clear return to the condemnatory attitude of the mid-1960s" at the university, although attitudes toward premarital intercourse with one partner have become steadily more accepting. Thus, they observe, "whether sexual conservatism has returned depends upon the character of premarital sex considered."

1. I. Robinson et al., "Twenty Years of the Sexual Revolution, 1965-1985: An Update," *Journal of Marriage and the Family*, 53:216, 1991.

Update was compiled and written by Michael Klitsch, editor of *Family Planning Perspectives*.

Hormones and Heart Disease

Women who use estrogen replacement therapy in the years after menopause may lessen their risk of dying of cardiovascular disease.¹ A total of 1,944 postmenopausal U.S. women who were at least 55 years of age when they were first surveyed between 1971 and 1974 were followed up in 1987. Overall, 631 had died by the time of the follow-up, 347 from cardiovascular disease. A multivariate analysis showed that when risk factors such as age and a history of diabetes, smoking or high blood pressure were controlled, women who had used estrogen replacement therapy were 34 percent less likely than the others to have died of cardiovascular disease. The authors then examined two potential sources of bias by including only patients for whom information on hormone use was known (some data having been imputed) and by including only patients who were still alive as of 1982. In both cases, the same general result was observed, although the number of cases was smaller and the results were not statistically significant. The investigators conclude that it may be possible to prevent "20 percent to 35 percent of the cardiovascular deaths experienced by women who do not use estrogen."

1. P. H. Wulf et al., "Reduction of Cardiovascular Disease-Related Mortality Among Postmenopausal Women Who Use Hormones: Evidence from a National Cohort," *American Journal of Obstetrics and Gynecology*, 164:489, 1991.

PID, Smoking Raise Ectopic Risk

Women with confirmed pelvic inflammatory disease (PID) or a chlamydial infection are 4-6 times as likely as other women to have an ectopic pregnancy, according to a recent French case-control study; moreover, heavy cigarette smokers are at nearly three times greater risk.¹ In 1988, a total of 279 women aged 15-44 with an extrauterine pregnancy treated at one of seven Paris maternity hospitals were contrasted with 279 comparable women who had given birth at the same facilities. The investigators found that aside from a history of ectopic pregnancies, the factors that had the greatest impact on the women's risk were a history of sexually transmitted diseases and confirmed PID (a relative risk of 5.8) and prior tubal surgery unrelated to ectopic pregnancy (a relative risk of 5.6). In addition, women among whom ovulation had been induced hormonally were almost three times as likely as other patients to have had an extrauterine pregnancy. The study findings also indicated that women who smoked more than one pack of cigarettes per day were 2.5 times as likely to devel-

op an ectopic pregnancy. When the analysis was restricted to 188 pairs of women for whom serology data on chlamydial infection were available, the researchers found that those with a chlamydial infection were 3.6 times as likely to have an ectopic pregnancy.

1. J. Coste et al., "Risk Factors for Ectopic Pregnancy: A Case-Control Study in France, with Special Focus on Infectious Factors," *American Journal of Epidemiology*, 133:839, 1991.

Late Effects of Prolonged Labor

Children who were delivered by cesarean section in the early 1950s after their mothers experienced protracted labor subsequently scored significantly lower on IQ tests than did siblings whose deliveries were uncomplicated.¹ Researchers retrospectively examined 54 cases in which complete data were available both for a child who was born between 1952 and 1954 by cesarean section after prolonged labor and for at least one sibling born by elective cesarean section (122 children in all). They found that at the age of 10, the children born after prolonged labor (who were mostly firstborn children) had a mean IQ score of 107, a little more than 10 points lower than that of their generally younger siblings, and a statistically significant difference. Moreover, the scores among those born after 12 or more hours of labor were consistently lower than the scores of their siblings, despite the tendency for firstborn children to have a higher IQ than their siblings. Another analysis showed that the children born after prolonged labor were significantly more likely than the others to have the lowest IQ scores in their family. The investigators comment that "labor with arrested progress may... cause some degree of fetal brain damage and so reduce potential IQ."

1. F. J. Roemer, D. Y. Rowland and I. F. Nuamah, "Retrospective Study of Fetal Effects of Prolonged Labor Before Cesarean Section," *Obstetrics & Gynecology*, 77:653, 1991.

Cocaine as a Fetal Hazard

Two large-scale studies have confirmed that women who use cocaine during pregnancy place their fetus at increased risk of a host of problems, ranging from premature delivery and low birth weight to low Apgar scores. One study involving more than 17,000 births in the Chicago area found that two percent of births were to women who admitted using cocaine or who were identified as users through urine toxicology screening.¹ Compared with children born to nonusers, those born to cocaine users were at almost three times greater risk of low birth weight

and more than twice the risk of premature delivery. Moreover, they were twice as likely to die perinatally, and nearly five times as likely to experience premature detachment of the placenta. The researchers conclude that "although the full extent of the impact of cocaine on perinatal outcomes remains to be established, our data... lend support for expanded treatment programs for pregnant women who use cocaine." The second study involved 1,111 women (all delivering at a New York hospital) whose urine specimens were anonymously tested for drug metabolites, as well as a subgroup of 846 women for whom linked health data were available for their infants.² Results showed that nearly 12 percent of the women had used cocaine during pregnancy, and that cocaine users were about one-sixth less likely than other women to have received prenatal care. Babies born to women who used cocaine were more likely to be of low birth weight, were born (on average) about a week earlier and had significantly decreased Apgar scores compared with infants born to mothers who showed no evidence of cocaine use.

1. A. Handler et al., "Cocaine Use During Pregnancy: Perinatal Outcomes," *American Journal of Epidemiology*, 133:818, 1991.

2. S. McCalla et al., "The Biologic and Social Consequences of Perinatal Cocaine Use in an Inner-City Population: Results of an Anonymous Cross-Sectional Study," *American Journal of Obstetrics and Gynecology*, 164:625, 1991.

Treating Ectopics Chemically

A combination of two drugs—methotrexate and citrovorum—has been successful as a medical treatment for unruptured ectopic pregnancy in 96 of 100 women.¹ Between 1987 and 1990, researchers treated 100 consecutive ectopic pregnancy patients; 96 of the ectopic pregnancies subsequently aborted, with the remaining four ending in tubal rupture. Fifty-five of the 96 women for whom the treatment proved successful needed only one or two treatments. Although the women encountered no major side effects, 24 experienced sharp abdominal pain during treatment. The researchers also report that there were 37 subsequent pregnancies among the study patients; 89 percent were intrauterine, and 11 percent were recurrent ectopic pregnancies. They conclude that the "reproductive outcome of patients following methotrexate therapy continues to be favorable while avoiding the risk and cost associated with hospitalization, general anesthesia and laparoscopy."

1. T. G. Stovall et al., "Methotrexate Treatment of Unruptured Ectopic Pregnancy: A Report of 100 Cases," *Obstetrics & Gynecology*, 77:749, 1991.

Oral Contraceptive Pill Use After an Initial Visit to a Family Planning Clinic

By Deborah Oakley, Susan Sereika and Erna-Lynne Bogue

Summary

A retrospective study of 1,311 women making initial family planning visits to metropolitan-area health department clinics found that many women switch methods or discontinue use in the first year following the clinic visits. Among a subgroup of women, most of whom selected the pill as their primary method and who used the pill for at least one of the months in the study period, almost half either changed methods or used no method at some point during a follow-up period averaging eight months. This includes 13 percent of women who made two or more changes. In addition, only 42 percent said they took a pill every day, and only half of these said they always took their pill at about the same time every day. Despite such irregularities, pill users were approximately one-third as likely to get pregnant during the study period as women making an initial family planning visit to a health department clinic who did not use the pill at all.

Introduction

Slightly more than one-half of all pregnancies in the United States are unintended,¹ even though only 10 percent of U.S. women who are at risk of unintended pregnancy

The patterns of contraceptive use among many of the participants during the 6–12 months following their initial clinic visit were complex, involving a wide range of use-patterns and among some women, multiple method-switching.

are not current contraceptive users.² One-half of women seeking abortions in 1987 said they had been practicing contraception during the month in which they became pregnant, but most of those failures could not be definitively attributed to method failure.³ In the United Kingdom, two-thirds of one clinic's sample of abortion patients said they had been practicing contraception when they became pregnant, although careful questioning indicated that one-third of the sample had become pregnant because of what the author termed poor compliance.⁴ Studies of 6–18 months in length have found that anywhere from three percent to 45 percent of U.S. family planning clinic clients become pregnant during that time, even though these women are sufficiently motivated to seek out and attend clinics.⁵ Patterns of effective contraceptive use are apparently difficult to establish.

Among average users, contraceptive failure rates have been shown to be higher than those found in clinical trials,⁶ and failure rates are known to differ by demographic group.⁷ Although contraceptive continuation has been extensively studied,⁸ other contraceptive behaviors are not well understood. To design effective interventions aimed at helping more people avoid pregnancies resulting from user-related contraceptive failure, we need to understand more about specific behaviors related to use. Avoiding pregnancy requires beginning use of a contraceptive at the right time and using it regularly, correctly and until a pregnancy is desired.

Eighty percent of U.S. women are on the pill at some time in their reproductive years,⁹ as are more than 60 million women world-

wide.¹⁰ This article examines oral contraceptive compliance by women who have had an initial family planning clinic visit, and looks specifically at behaviors related to effective oral contraceptive use and at how often women start and stop using the pill over a short period.

Methods

Data for this report come from a larger study of nursing intervention in contraceptive care that was conducted from February 1987 through April 1989 at the Oakland County Health Division (OCHD) in Michigan.¹¹ Oakland County encompasses metropolitan areas near Detroit. Three OCHD clinics serve the Oakland County inner-city and suburban populations. All women making an initial visit to any of the three OCHD clinics were eligible to participate in the study. Specially trained study nurses recruited participants at the start of their initial clinic visit. To save money, the nurses did not attend a clinic when fewer than three initial visits were scheduled, because the possibility of no-shows could mean that no eligible respondents would attend that clinic session. Inclement weather also caused cancellation of some planned recruitment sessions. During the 27 months of the study, subject recruitment occurred at 82 percent of the clinic sessions.

Ninety-five percent of the women approached agreed to participate in the study. Information on participants was collected through a questionnaire they were asked to complete at the first visit and from their clinic charts. At a follow-up telephone call 6–12 months after their first clinic visit, the women were asked about their contracep-

Deborah Oakley is a professor at the Center for Nursing Research, University of Michigan School of Nursing. Susan Sereika, an assistant professor at the University of Pittsburgh School of Nursing, was a doctoral student in biostatistics at the University of Michigan School of Public Health and a graduate research assistant in the School of Nursing at the time the research for this article was conducted. Erna-Lynne Bogue is a doctoral student in social work and social science at the School of Social Work and Department of Sociology and a graduate research assistant at the School of Nursing, University of Michigan. This research was funded by grants from the National Center for Nursing Research at the National Institutes of Health. Grant #5RO1-01341, and the office of the vice president for research at the University of Michigan. Special appreciation is extended to Jackie Davis, coordinator of the family planning program at the study site, and to the following graduate students who contributed to data analysis: Joanna Tsai, Wei-Ying Yuan, Jeffery Parent, Mary Ellen Murray and Michele Acker.

tive use during the interval.* On average, the women were reached a little less than eight months after their initial visit. A computer-assisted interview schedule was used for this outcome interview to ensure that all appropriate follow-up questions were asked.

Approximately two weeks after the original call, 30 women were contacted for a repeat interview. As measured by statistical significance and a Cohen's kappa of 0.80 or higher for most items, adequate (at least 0.60) or high test-retest reliability was achieved unless noted. Standard quality-control procedures were used for all data.†

Since the original study's intervention was based on a self-care theory and did not affect behaviors related to oral contraceptive use, our analysis includes all respondents, regardless of the treatment group to which they were initially assigned. The entire sample consisted of 1,819 women who were first-time patients at the family planning clinic. Of those, 1,311 (72 percent) were reached for the outcome interview, a proportion similar to those achieved in other studies of comparable numbers of family planning patients.¹²

Sample Characteristics

The population was relatively young, a finding not surprising for a publicly supported clinic: The mean age was 20 for both samples. Other selected demographic characteristics of the total and outcome samples are shown in Table 1. Just over one-half of the clients had not completed high school. Most of the respondents were white (87 percent), never-married (83 percent), childless (76 percent) and had never had either a spontaneous or induced abortion (77 percent).

Compared with women who were served by family planning clinics nationwide in 1983 (the most recently published data), the sample studied here was less likely to be receiving public assistance—six percent of our sample, compared with 13 percent nationally.¹³ This difference may be related to the difference in age distribution: Nationally, 32 percent of family planning clinic patients are younger than 20,¹⁴ compared with 62 percent of our sample. However, 69 percent of those receiving publicly supported family planning services in Michigan in 1987 were younger than 20.¹⁵

Table 1 also shows that the original and outcome samples were similar demographically. In addition, two-thirds of both samples were recorded in the clinic charts as having used some birth control method regularly at some time prior to visiting the clinic. When asked about the last method they used before the initial clinic visit, 45 percent of the outcome sample said they had used

Table 1. Percentage distribution of women who had made an initial visit to a family planning clinic, by selected demographic characteristics, according to the total sample and the outcome sample, Oakland County, Michigan, 1987–1989

Characteristic	Total sample (N=1,819)	Outcome sample (N=1,311)
Education (yrs.)		
<12	52.1	51.1
12	31.8	31.0
≥13	15.1	16.3
Unknown	1.3	1.5
Race		
White	86.1	87.1
Black	12.4	11.4
Other	0.6	0.6
Unknown	0.8	0.9
Marital status		
Never-married	82.7	83.2
Ever-married	17.0	16.5
Unknown	0.3	0.3
No. children born alive		
0	74.2	76.1
1	15.5	14.4
≥2	10.2	9.2
Unknown	0.2	0.2
No. of spontaneous or induced abortions		
0	75.4	76.6
1	17.0	16.5
≥2	7.5	6.7
Unknown	0.2	0.2
On Medicaid		
Yes	5.9	5.0
No	93.9	94.8
Unknown	0.2	0.2
On public assistance		
Yes	7.1	6.1
No	91.1	91.8
Unknown	1.8	2.1
Last method used		
Pill	45.2	44.9
Condom	20.2	21.1
Diaphragm	0.5	0.6
Other	3.5	3.4
None	30.7	30.0
Total	100.0	100.0

the pill and 21 percent said they had used the condom. Oral contraceptives were the method of choice at the clinic, regardless of the last method used: At their initial visit, 93 percent of the women elected to use the pill, 4.6 percent the condom, 1.5 percent the diaphragm and 1.0 percent selected other methods or nothing (not shown).

Patterns of Pill Use

During the follow-up interview, the women were asked to name the *main* method of birth control they had used during each month since their initial clinic visit.‡ Responses included the pill, the condom, the

diaphragm, abstinence, rhythm, withdrawal, other, no method and pregnancy. Pill use was reported both among women who had chosen this method at their clinic visit and among those who had not. Of the women who had chosen the pill, only 92 percent reported actually using it during the follow-up period. However, of the seven percent of women who did not choose this method at the clinic, 47 percent said they had used it during at least one month since attending the clinic. The following analyses deal only with the 1,167 women who reported that the pill had been their main method during at least one month of the study period; we refer to them as pill users.

• *Method continuity.* There were many patterns of use among the pill users. When month-by-month reports of methods used (including no method and pregnancy) were arrayed sequentially, disregarding duration of use, there were 89 separate patterns. The simplest pattern, followed by 55 percent of the women, was use of the pill during all the study months (Table 2, page 152). The most complex pattern was the sequence of no method, condom, no method, condom, pill, no method. Thirty-eight percent of the pill users used the pill and one other option (another method, no method or pregnancy). While 32 percent made only one change—either beginning with another method, no method or pregnancy and switching to pill use (20 percent), or beginning with the pill and then switching to another method, no method or pregnancy (approximately 13 percent)—almost five percent made two changes, and one percent made three or more. Eight percent of the women reported use of two or three other options. Overall, 13 percent of pill users changed their use behavior two or more times.

The condom was the method most commonly changed to or from. All pill users were given one dozen condoms at their clinic visit, and when appropriate, were counseled to use condoms for their first month

*Agreeing to participate in the telephone follow-up was part of the informed consent process. Following an established protocol, when callers reached someone other than the study respondent, the purpose of the call was not revealed.

†Quality-control procedures included careful and extensive training for all data collection staff; double editing for missing and ambiguous data and double data entry with verification for all questionnaire data; outlier and consistency checks for all data; and careful training and supervision, including on-line monitoring of telephone interviews.

‡To calculate Cohen's kappa for the method used month by month, reports were collapsed into pill, other method, no method or missing. Kappas for the reports of the first four study months were 0.50 or lower. Kappas for the other month-by-month reports were all above 0.60.

Table 2. Number and percentage distribution of women who used the pill for at least one month, by the pattern of use

Pattern	N	%
Pill only	636	54.5
Pill and one other option*	442	37.9
One change	377	32.3
Other method, pill	186	15.9
No method or pregnancy, pill	45	3.9
Pill, other method	65	5.6
Pill, no method or pregnancy	81	6.9
Two changes	54	4.6
Pill, other method, pill	17	1.5
Pill, no method or pregnancy, pill	13	1.1
Other method, pill, other method	17	1.5
No method or pregnancy, pill, no method or pregnancy	7	0.6
Three changes	9	0.8
Four changes	2	0.2
Pill and two other options*	87	7.5
Two changes	54	4.6
Three changes	27	2.3
Four or five changes	6	0.5
Pill and three other options*	2	0.2
Three changes	1	0.1
Four changes	1	0.1
Total	1,167	100.0

*The possible options are another method (i.e., the pill, the condom, the diaphragm, abstinence, rhythm, withdrawal or other) and "no method or pregnancy."

Note: Because of rounding, sums of percentages may not equal totals.

of pill use. Thus, it is not surprising that one-quarter of the women reported that the condom was their main method for at least one of the study months.

To determine whether condoms were used during the first month of pill use by women who were starting or resuming pill use, two groups were created. The 610 pill users who did not cite oral contraceptives as their last regular method prior to the initial clinic visit were categorized as "new pill users." Although some women in this group may have used oral contraceptives previously, the pill was not their most recent regular method. Another 216 women reported that the pill had been their last method but that they had stopped using it prior to visiting the clinic. These women were categorized as "restarters."

Although condoms were more commonly used in the first month by new pill users than by restarters, in neither group did the majority cite condoms as their main contraceptive method during the first month: Twenty-one percent of the new-user group and nine percent of the restarters said they used condoms as their main method in the first month and the pill in the second month.

Use of other methods during the first month, followed by use of the pill in the second month, accounted for only three percent of the new pill users and four percent of the restarters.

Ninety-five percent of the women had only one pill start, indicating that almost everyone either stayed with the pill once they had started using it or did not return to it once they had stopped. Three-quarters never stopped using it, and less than one percent stopped using it more than once. We measured four factors believed to be associated with pill discontinuation: side effects, missed pills, depletion of supplies and sexual inactivity.

Side effects are often thought to be a primary reason why many women stop using the pill. One-third of the pill users in our study reported having experienced side effects. Almost all of these women evaluated the side effects as definitely or probably related to their method and one-fifth said that at least one side effect was severe. Although a number of pill-taking behaviors were significantly related to the experience of side effects, this accounted for only a small part of the variance. For instance, the mean number of pill stops was significantly higher ($p < .001$) for those who had side effects than for those who did not (0.29 vs. 0.19), but having had side effects predicted only one percent of the variance in the number of pill stops. Even less of the variance in the number of stops was predicted when severity of the side effects was taken into account.

We asked women who said they sometimes missed a pill ($N=690$) if they had then stopped their pill cycle; only six percent said they had. Of those women, 11 percent said they stopped because the clinic told them to; 27 percent said they stopped because they themselves thought it would be best; five percent because they did not know what else to do; and 57 percent gave other, generally vague, reasons. One-half of the women who said they had stopped taking the pill after missing some said they restarted after their period, and five percent said they restarted after some days had passed; 41 percent, however, said they did not begin taking the pill again.

Women may also discontinue pill use if they run out of supplies. The women in the clinic studies were given up to seven packs (cycles) of pills; three-quarters of the pill users were given four cycles. At the time of the outcome interview, 71 percent of the pill users said they had gotten refills from the clinic and 11 percent said they had gotten them elsewhere (seven percent from private physicians), leaving 18 percent who had not gotten refills.

Women may also stop taking oral con-

Table 3. Number of pill users, number who discontinued use and percentage who stopped, by the number of months of sexual activity during the study period

Months sexually active	Number of users	Number who stopped	% of users who stopped
Total	1,167	287	24.6
0 -	44	13	29.6
1	31	16	51.6
2	31	11	35.5
3	55	26	47.3
4	94	36	38.3
5	93	26	28.0
6	139	28	20.1
7	319	67	21.0
8	222	41	18.5
9	86	12	14.0
10	37	8	21.6
11	6	0	0.0
12	10	3	30.0

traceptives if they are no longer sexually active. However, only 30 percent of the pill users who said they had not had sexual intercourse between the time of their clinic visit and the outcome interview had stopped taking the pill. As shown in Table 3, the likelihood of having discontinued pill use was generally higher among those who had had fewer total months of sexual activity. For instance, of the 31 women who were sexually active for only one of their study months, 52 percent stopped taking the pill, while of the 319 women who were sexually active during seven of the months, 21 percent discontinued use. Eight women stopped pill use, restarted and stopped again. Among the entire group of pill users, 30 percent used the pill for more months than they were sexually active, 41 percent used it for the same number of months that they were sexually active and 29 percent used it for fewer months than they were sexually active.

We examined the data for the group of 337 women who were sexually active for more months than they took the pill so we could determine whether they switched to other methods or were unprotected during the study months in which they were not taking the pill. The main alternate method used by the group was the condom: Sixty-nine percent reported using this as their main method during at least one study month, accounting for 18 percent of the study months for which we have data on these women. The diaphragm and less effective methods were seldom used, accounting for a minuscule amount of additional protection. Twenty-eight percent of these women reported using no method for at least one study month, accounting for 11 percent of the study months for which we have data.

• *Quality of use.* Method discontinuation is not the only form of risky behavior in contraceptive practice. How the contraceptive is used can also affect the success of avoiding unintended pregnancy. We measured six behaviors related to use that together constitute a scale to measure the quality of pill use:¹⁶ never taking someone else's pills; always taking the pills in the same order in the pack; taking every pill in the pack; always using a backup method if several pills are missed; taking a pill every day; taking a pill every day at the same time. Physicians, nurses and researchers as well as material in a clinic manual¹⁷ identified these six items as important factors in effective pill use.

As Table 4 shows, almost all the women took only their own pills (99 percent) and always took them in the same order in the pack (98 percent). Almost 89 percent always took all the pills in their pack. When asked to give the highest number missed, 38 percent of the pill skippers said they missed at most two or fewer pills, but 11 percent said their highest number missed was 8–20 pills. Only 61 percent either never missed more than two pills in a row or always used a backup method if they did. However, only 42 percent said they took a pill every day, and only 20 percent said they always took it at the same time every day, plus or minus two hours. The average number of use-behaviors always done correctly was four. Only 13 percent used the pill completely correctly all the time, and 40 percent did three or fewer of the use-behaviors correctly all the time.

Let these results appear overly alarming, adequate compensatory behavior also needs to be taken into account. Altogether, three-quarters of the women took their pills within the recommended window of hormonal safety, either because they took a pill every single day or always remembered to take a missed pill by the end of the next day. Most of those who missed a pill took two the next day, but not together.

Pregnancy

Ultimately, we are interested in the effect of contraceptive behaviors on pregnancy outcomes. Almost seven percent of the entire

Table 4. Percentage of pill users, by behaviors related to effective contraceptive use

Behavior	%
Never took others' pills	98.6
Always took pills in same order	98.0
Took all pills	88.8
Always used backup method or never needed backup method	61.3
Took pill every day	41.7
Took pill every day, always at same time	19.6

outcome sample reported that they had become pregnant* since their first visit to the clinic. But the proportion who became pregnant differed markedly by whether these women had or had not used oral contraceptives during the study. Only 5.5 percent of women in the pill-user group reported a pregnancy, compared with 16.0 percent of the women who did not report using oral contraceptives at all during the study. To provide a more standardized measure, we calculated the number of pregnancies per 100 woman-years in the study. For the total study group, there were 12.0 pregnancies per 100 woman-years in the study, with 9.9 pregnancies per 100 woman-years among pill users and 31.0 among nonusers.[†]

Discussion

The data presented here show that the patterns of contraceptive use among many of the participants during the 6–12 months following their initial clinic visit were complex. One in seven women who used the pill during the study period switched their method (or switched to no method) two or more times. Switching methods is risky because, as shown, less effective methods are used or, worse, no method is used. In addition, one-quarter of the pill users reported pill-taking behaviors that could put them at risk of pregnancy. The risk in not taking the pill correctly is that the level of hormonal protection will lapse, allowing ovulation. This risk is higher when the pill cycle is started late or stopped early.¹⁸ Furthermore, although pill manufacturers and clinicians recommend use of backup methods for the duration of risk, the data presented here make it apparent that women often

do not use backup methods when needed.

The findings presented here about specific behavior patterns are consistent with scattered reports from around the world that oral contraceptive use can be sporadic, even during months categorized as protected by oral contraceptives. Studies in Pakistan,¹⁹ Egypt,²⁰ Bangladesh,²¹ Colombia,²² Sri Lanka²³ and Thailand²⁴ have all reported that women miss significant numbers of pills, take too many pills to compensate for missing pills, terminate cycles prematurely, start cycles late and take pills out of sequence. Some of the same use-behaviors have previously been identified among women in the United States. For instance, only one-half of 51 young women from a Cornell Medical Center clinic said they had taken a pill every single day over a study period of one year.²⁵

How should we interpret risky contraceptive behavior among women motivated enough to make and keep a family planning clinic appointment? First, these behaviors should probably be viewed in the context of what is often referred to as "implementing behavioral intentions." When confronted with problems, people make up their own solutions—for example, switching methods. And, like individuals planning to diet or exercise, or to take medication of any kind, pill users do not always carry out their intentions. Seen in the context of medication compliance, where 50–60 percent of people taking medication are reported to skip occasional doses and 30–40 percent omit doses altogether or make major errors in timing,²⁶ the figures here are relatively modest. The problem with errors in using birth control is that pregnancy can result.

Although pill users were far less likely than nonusers to become pregnant, they still experienced higher failure rates than those estimated for the general population.²⁷ Since our figures are well within the range of findings from other studies,²⁸ we can conclude that clinic populations are more likely than nonclinic populations to experience pregnancies while using birth control; they may be more fecund and have intercourse more frequently. Other characteristics of the women may also be important. Whatever the reasons, it appears

*Women were said to have become pregnant since their first visit if pregnancy was indicated in one or both of two ways. First, a woman was counted as having become pregnant if she reported pregnancy for at least one month when giving her contraceptive use history for the study period. (However, if that month included her first month after the clinic visit and clinic records showed that she was pregnant at that first visit, it was assumed that she was pregnant before the study began and she was not counted as becoming pregnant since her first visit.) Second, a woman was counted as having become pregnant if she answered "yes" to the separate question: "Did you become pregnant since [date of clinic visit]?"

Eighty-six percent of those who said yes also reported that they had had a pregnancy test at a clinic or a doctor's office.

†Woman-years of exposure were calculated following standard rules. (See: J. Trussell and J. Menken, "The Calculation of Gross Rates of Continuation for Contraceptive Methods: Single and Multiple Increment Life Tables," Appendix IV in B. Vaughn et al., "Contraceptive Efficacy Among Married Women Aged 15–44 Years," Vital and Health Statistics Series 23, No. 5, 1980; C.R. Hammerslough, 1984, reference 8; and J. Trussell and K. Kost, "Contraceptive Failure in the

United States: A Critical Review of the Literature," Studies in Family Planning, 18:237, 1987.) Since rules have been developed for clinical trials and for national sample surveys, neither of which are totally applicable, we made further modifications in assumptions about appropriate reductions in exposure to risk because of censored data. Results presented in the text are based on subtracting one month from the exposure (in case women are pregnant and do not know it at the end of the study). Subtracting two months from exposure leads to much higher rates of pregnancies per 100 woman-years: 14.2 for the total group, 11.6 for pill users and 36.6 for nonusers.

that clinic populations need particular help in using their contraceptives effectively.

What is the role of clinics and clinicians in trying to affect contraceptive behaviors? Tape recordings of the usual care provided in two family planning clinics showed that the clinicians generally did not assess women's abilities to carry out the complex, repetitive series of actions required for high use-effectiveness.²⁹ Although clinic counseling cannot assure adequate self-care abilities for all women, we need to redesign clinical interventions to evaluate women's abilities to achieve high use-effectiveness and to help more women be prepared to solve problems when they arise. Emphasis may now need to change from information about costs and benefits of contraceptive methods and how to use them to problem-solving techniques.

Various interventions to improve diverse measures of contraceptive use have been tried with only modest success, if any.³⁰ More attention needs to be devoted to systematic assessments of interventions based on a wide range of theories, including contingency contracting, self-care and developmental abilities. The medical compliance literature suggests that clinicians need to ask questions, to listen and to interactively help women figure out how they are going to fit contraceptive behavior (e.g., daily pill-taking) into their own life-styles.³¹ It is not enough to tell the patient what to do. Since contraceptive use during the months ahead requires an ability to generalize and solve problems under unanticipated circumstances, rote knowledge is insufficient.

From both a research and a clinical perspective, the findings presented here suggest that method-switching, like actual method use, is a complex and varied process. In a recent article on women practicing contraception over fairly long periods of time, William Mosher discusses the need to focus more attention on those who switch from one method to another method.³² However, his article focuses on method continuation over a number of years. The data presented here document multiple method-switching by some women and a wide range of use-patterns even within the relatively brief period of 6-12 months. Since these findings are consistent with other studies that have examined contraceptive behaviors, new research approaches and new measures are needed to evaluate the programmatic interventions designed to enhance use-effectiveness.

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Unplanned Childbearing and Family Size: Their Relationship to Child Neglect and Abuse

By Susan J. Zuravin

Summary

Mothers from 198 low-income, female-headed families enrolled in child protective services because of child abuse or neglect were compared with an equal number of age-matched controls, to determine if unplanned childbearing and family size increase the risk of child neglect or abuse. Logistic regression analyses suggest that unplanned childbearing increases the risk of child abuse but not of child neglect. Large family size significantly raises the risk of both types of maltreatment, although this factor had a greater effect on the risk of abuse than on the risk of neglect. Finally, unplanned childbearing appears to be indirectly related to abuse through its effect on family size.

Introduction

Years of research on the treatment of families who physically neglect or abuse their children have led to one conclusion: Both types of maltreatment are extremely resistant to intervention. A recent review of 10 years of findings from treatment studies concluded that "putting all resources into intervention after the fact does not make much sense. . . . Intervention much earlier with families would produce better results."¹ Of the many primary and secondary preventive strategies that have been considered, family planning approaches have been the object of more discussion than most. Research has shown that there are similarities between the psychosocial profiles of high-risk contraceptive users and maltreating mothers,² and that large family size and close spacing of children are associated with maltreatment.³ Such results have led child welfare professionals to propose that programs aimed at helping women improve their

A child from a family with two unplanned births is 2.8 times more likely to have been abused than is a child from a family with no unplanned births; one from a family with three unplanned births is 4.6 times more likely to have been abused.

family planning skills may be the best means of preventing child abuse and neglect.⁴

However, there has been little effort to explain how unplanned childbearing leads to child abuse and neglect. A causal relationship could be explained in many ways and might differ as a function of family characteristics and type of maltreatment, but a review of the literature identified only a few references to one theory.⁵ This theory predicts that an unplanned child is at greater risk of maltreatment than a planned child because of the circumstances of his or her birth and because of what the child may represent to the parent—i.e., a financial and emotional burden, an impediment to the pursuit of valued goals and activities and a reminder of pleasures that can no longer be enjoyed.

Along with unplanned childbearing, family size may be a particularly salient characteristic to examine, for three reasons. First, family size can be a function of unplanned childbearing. Second, studies from the family sociology literature have consistently documented that large family size is associated with more severe parental role stress, more authoritarian parent-to-child interactions, more child neglect and greater use of physical punishment⁶—factors that have repeatedly been associated with both types of maltreatment.⁷ Third, research has documented that abuse and neglect are associated with large family size,⁸ that large family size is a powerful predictor of neglect for very low-income, single-parent families, and that the family-size threshold for neglect may be higher than that for abuse.⁹ Direct comparisons of abusive and neglectful families have consistently shown that neglectful families

have more children than do abusive families.¹⁰

As might be expected, given the state of theory, the vast majority of existing studies (eight out of 10)¹¹ have focused on testing the hypothesis that the unplanned child is at greater risk of maltreatment than the planned child. Four used a sample consisting exclusively or mainly of physically abused children,¹² and only one of these found unplanned children more likely to be physically abused.¹³ Another four examined samples consisting of predominantly neglectful respondents or mixtures of both neglectful and abusive respondents;¹⁴ all found the maltreated child to be significantly more likely to be unplanned or unwanted than the comparison child. However, because these samples included a mixture of both abused and neglected children, it was impossible to determine if only one type or if both types of maltreatment are associated with planning status. In addition, families who maltreated an unplanned child may have, particularly through neglect, maltreated all or many of their children, regardless of their planning status. The studies failed to determine the planning status or maltreatment status of other children in the family, and so the unplanned child may have been but one of many maltreated children, of whom some were planned and others were not.

The other two studies were aimed at determining if unplanned childbearing is a pattern of behavior associated with physical abuse or neglect.¹⁵ Both sampled maltreating families from a population known to public child protective services, and both found a positive association. Unfortunately, each measured the number of unplanned children

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at the time of the interview, a varying number of years after the maltreatment became known to child protective services, so it is impossible to determine whether the unplanned child was born before or after maltreatment began. Moreover, neither adequately controlled for mother's age, which can be done by pair-matching so comparison mothers are the same age as the maltreating mothers were at the time they were first reported to child protective services.

Thus, methodological problems limit our ability to draw conclusions from these individual studies, and methodological diversity obstructs the comparison and integration of findings across studies. Two design problems are characteristic of all of them. First, the majority failed to control adequately for social and demographic background characteristics. Second, none controlled for maternal age at first birth, strength of parental coping and the parents' own rearing history. In addition, they often used different operational definitions for the planning status of the children and for maltreatment. Some collected information from case records, while others took data from personal interviews with the mothers. The populations from which the maltreating samples were drawn differed widely, with some chosen from child protective services, others from hospital emergency rooms and still others from among high-risk but not maltreating populations. Finally, some were prospective, while others were retrospective.

One paper cannot identify and test all of the conceivable explanations for a relationship between unplanned childbearing and maltreatment. This article focuses on determining if unplanned childbearing and large family size increase the risk of child abuse and neglect among low-income women,

and on testing three alternative explanations of how unplanned childbearing, family size and child maltreatment might be associated. Hypothesis One is that the relationship between unplanned childbearing and maltreatment is indirect, with unplanned births leading to a larger family that, in turn, adversely affects the adequacy of child care. Hypothesis Two is that family size and unplanned childbearing independently increase the risk of maltreatment. Hypothesis Three is that the effect of unplanned childbearing on maltreatment depends on family size, perhaps with unplanned childbearing increasing the risk of maltreatment in small families but not in large ones.

Sample Selection

This study was conducted on a subset of women from a 1984-1985 survey of very low-income, single mothers.¹⁶ The primary objective of the survey was to examine the relationships among fertility patterns, family planning behavior and the adequacy of child care. Participants were women who in January 1984 (the study sampling month) were not living with a legally wedded spouse, were residing in Baltimore and were receiving Aid to Families with Dependent Children (AFDC) for at least one biological child aged 12 or under. (The study was restricted to single AFDC recipients because prior research has suggested that such parents are at extremely high risk of child maltreatment.¹⁷) The women were recruited from samples of three different populations of clients of the Baltimore City Department of Social Services. All members of the three samples were recruited by letter; if there was no response, the women were approached in person by an interviewer.

A total of 238 families known to the Baltimore Division of Child Protective Services in January 1984 because of physical abuse met the three general study criteria and had at least one biological child who had been physically abused.* For our analysis, we selected every family in which the mother was the identified perpetrator; we also chose a random sample from among the remaining families (in which the perpetrator of abuse ranged from fathers or boyfriends to babysitters and unidentified individual†). Out of this sample of 152 families, mothers of 118 abused children (77.6 percent) agreed to participate.

During January 1984, a total of 381 families who met the general study criteria were known to the Division of Child Protective Services because they had at least one biological child who met the study definition of physical neglect,‡ had no children who met the criteria for physical abuse, and had

been identified as families in which the mother was the perpetrator of neglect. From these, we selected every white family and a random sample of the black families. (White families were oversampled to ensure enough participants to carry out separate analyses by race.) From this sample of 164 families, 119 mothers (72.6 percent) agreed to participate.

Finally, from among 37,158 female-headed families who were receiving AFDC during January 1984, who met the other two general study criteria and who had never received child protective services, foster care services, services to families with children or single-parent services, we systematically selected a sample of 376 families; 281 mothers (74.3 percent) agreed to participate.

The 518 women who elected to participate in the study—118 with one or more physically abused children, 119 with one or more neglected children but no abused children and 281 receiving AFDC but not known to have abused or neglected their children—were interviewed in their homes sometime between September 1, 1984, and June 31, 1985, by trained female interviewers who were unaware of the child maltreatment status of their assigned respondents. The questionnaire, which was designed to tap a wide range of subjects, included only closed-ended items. Because of the study population's low level of literacy, the entire interview was read to the respondents. Of the 174 women who were not interviewed, 32 percent refused to participate, 44 percent could not be located and 24 percent had moved out of Baltimore.

The internal validity of a study such as this one is particularly dependent on two design characteristics. First, it is important to measure both the number of unplanned children and the family size at the mother's age when maltreatment of her child began, because families sampled from a child protective service population vary tremendously with respect to the amount of time that has elapsed since they were first identified as maltreating. Second, these characteristics must be measured at that same age for the control mothers, to prevent the misestimation of differences. Thus, each mother of an abused child and each neglectful mother was pair-matched by age with one control mother. Matching was done so that the control mother was the identical age at the time of the study interview as the corresponding study participant was at the time maltreatment was first identified.

To pair-match the mothers, all families reported for maltreatment prior to the mother's 20th birthday (24 in the neglect group and 13 in the abuse group) and all three

*An abused child was defined as one who had sustained injuries at a minimum severity level of four—such as bruises, welts, cuts, abrasions or first-degree burns—on the Magura-Moses Physical Discipline Scale. (See: S. Magura and B. Moses, *Outcomes Measures for Child Welfare Services*, Child Welfare League of America, New York, 1986.)

†Although it would have been optimal to have examined separately families in which the mother, the father, the mother's boyfriend, the babysitter, or an unidentified person was the perpetrator, there were simply not enough in any one subgroup to assure sufficient statistical power for multivariate statistical techniques.

‡A child was considered physically neglected if he or she received a minimum rating of four on the Magura-Moses nutrition/diet scale or a rating of three on any of the following Magura-Moses scales—physical health care, mental health care, personal hygiene, household sanitation, physical safety in the home, supervisor of activities, and arrangements for substitute child care. The minimum rating on any of these scales indicates that the child's physical or mental health was endangered by parental omissions in care.

control mothers who were teenagers at the time of the interview were first excluded from the study. (This was done because current theory suggests that the etiological factors associated with maltreatment by teenagers differ from those associated with maltreatment by older mothers.¹⁸) Second, the remaining study families (95 in the neglect group and 105 in the abuse group) were sorted into subgroups by the mother's age at the time of first reported maltreatment; the remaining 278 control families were sorted by the mother's age at the time of the interview. Finally, each study mother was matched with one randomly selected control mother from the appropriate age-group. Thus, the neglect sample included 190 women (95 neglectful mothers and 95 comparison mothers) and the abuse sample included 210 women (105 mothers of abused children and 105 comparison mothers). However, because of missing data, analyses for the neglect sample could be performed for only 94 pairs, and analyses for the abuse sample could be performed for only 104 pairs.

Study Variables

The two dependent variables in our regression analyses are child neglect and child abuse. The independent variables are unplanned childbearing and family size. For the maltreating mothers, unplanned live births is the number of children born prior to the first substantiated incident of abuse or neglect; for the comparison mothers, it is the number born prior to the day of the interview. Live births are classified as unplanned on the basis of the National Survey of Family Growth, Cycle III, definition:¹⁹ A birth is considered unplanned if the respondent answered "no" to the question, "At the time you became pregnant, did you yourself want to have another baby at some time?" or if she replied "sooner than I wanted" to the question, "Did you become pregnant sooner than you wanted, later than you wanted, at about the right time, or didn't you care?"

Family size is the total number of live births to each mother, regardless of planning status.* In the maltreating families, these variables are measured according to the number of children born prior to the date of the first substantiated report of child maltreatment made to the Division of Child Protective Services; for the control families, they are measured by the number of children born prior to the study interview.

In addition, eight maternal characteristics are controlled. Socioeconomic status and single parenthood are controlled by selection, mother's age is controlled by matching and five characteristics are controlled sta-

Table 1. Selected characteristics of mothers of neglected children and abused children and of control mothers, by type of maltreatment (standard deviations in parentheses)

Characteristic	Neglect group (N=94)	Control group (N=94)	Abuse group (N=104)	Control group (N=194)
Age	26.1 (5.1)	26.1 (5.1)	24.9 (4.4)	24.9 (4.5)
Education (in yrs.)	9.9 (1.8)	11.0 (1.8)	10.4 (1.8)	11.1 (1.5)
% black	70	90	80	90
Age at first birth	18.3 (2.4)	18.8 (2.6)	18.5 (3.0)	19.3 (2.6)
Family size	3.2 (1.9)	2.0 (1.2)	2.4 (1.2)	1.5 (0.8)
No. of unplanned births	1.5 (1.2)	1.2 (0.9)	1.4 (1.0)	0.9 (0.8)
% with coping problems	60	20	50	20
% maltreated as a child	40	20	30	20

tistically. Of these five, two—race and education (last grade of school completed by the mother)—are controlled because of the possibility that they could act as confounding variables. (For example, lower educational achievement is associated with both types of maltreatment,²⁰ as well as with an increased likelihood of bearing unplanned children.²¹) The other three—coping problems, age at first birth and the respondent's own experience with poor-quality care or with child maltreatment while growing up—are also controlled because they could function as confounding variables. All are hypothesized to affect the adequacy of a mother's care for her own children,²² and are associated with a woman's ability to use contraceptives effectively.²³

Coping adequacy is determined by whether mothers reported ever having received inpatient or outpatient treatment for depression or personal problems, ever having been drunk for at least two days without sobering up or ever having used heroin, cocaine or psychedelic drugs for periods of two weeks or more.

Poor-quality care or maltreatment during childhood is indicated if mothers reported that as children they were severely and frequently beaten by any caretaker or other person who lived in the same household, were sexually abused† or were physically neglected (i.e., frequently went hungry, frequently did not have decent clothes or frequently were not taken to the doctor when sick).

Maternal Characteristics

Descriptive data on demographic characteristics of the mothers in the sample are displayed in Table 1. The mean age of the neglecting mothers and their age-matched controls is 26.1 years; the mean age of the mothers of an abused child and their age-matched controls is 24.9 years. In each group, the control mothers tend to be somewhat better-educated than the study mothers. All four groups of mothers are predominantly black.

On average, members of all four groups are likely to have had their first birth as teenagers, although the mean age at first birth among control mothers is somewhat higher than that of the study mothers. Control mothers generally have had substantially fewer children than their counterparts: For example, in the neglect group control mothers have had 2.0 children, on average, while study mothers have had 3.2. Both mothers of neglected children and mothers of abused children have had more unplanned births than the control mothers—1.5 unplanned births among neglectful mothers and 1.4 among mothers of abused children, compared with 1.2 and 0.9 unplanned births among their respective control groups.

The measure of maternal coping problems indicates that study mothers have more problems with alcohol, drugs and depression than did the controls: In the neglect group, 60 percent of the mothers experienced coping problems, compared with 20 percent of control mothers. The differences in the women's experience of maltreatment during their own childhood are small.

Table 2 (page 158) is a correlation matrix showing bivariate associations between the different variables examined. (Abuse correlations are shown in the upper-right triangle; neglect correlations are shown in the lower-left triangle.) Abuse and neglect both

*Live births, rather than the number of children living in the home, is likely to be a better indicator. Children tend to come and go in low-income households, particularly maltreating ones, spending varying periods of time with relatives, neighbors or friends of the parent. As a result, if the number of unplanned children (or total number of children, regardless of planning status) living in the household at the time when the family was first identified as maltreating is smaller than the number who lived there a few weeks or months prior to the maltreatment, the effect of family size and unplanned children on abuse and neglect is likely to be underestimated.

†Sexual abuse was defined as either molestation (anyone having touched her breasts, genitals, or other private parts or having forced her to touch someone else's) or forced intercourse.

Table 2. Correlation matrices for child neglect and child abuse

Neglect correlations	Abuse correlations							
	Neglect	Family size	No. of unplanned births	Age at first birth	Maternal coping problems	Maltreated as child	Education	Race
Abuse	na	.39	.30	-.14	.29	.16	-.20	-.15
Family size	.36	na	.51	-.37	.14	.07	-.21	-.09
No. of unplanned births	.16	.50	na	-.42	.18	.06	-.16	.01
Age at first birth	-.09	-.27	-.27	na	.00	-.02	.20	-.19
Maternal coping problems	.41	.07	.01	-.06	na	.31	-.07	-.21
Maltreated as child	.23	.01	.07	-.16	.27	na	-.04	-.16
Education	-.28	-.16	-.15	.16	-.07	-.07	na	.27
Race	-.18	-.00	.08	-.14	-.14	-.05	.35	na

Note: The neglect correlations are based on data from 188 respondents and the abuse correlations are based on data from 208 respondents. The upper triangle is the abuse correlation matrix; the lower triangle is the neglect correlation matrix. All correlations of .15 or greater are significant at $p < .05$ using a two-tailed test of statistical significance. In this and subsequent tables, na=not applicable.

appear strongly correlated with family size (0.39 and 0.36, respectively). The data indicate a weak relationship between the number of unplanned live births and neglect (0.16), and a stronger association between abuse and unplanned childbearing (0.30). The measure of maternal coping problems also is strongly associated with neglect (0.41) and abuse (0.29), but childhood experience with maltreatment is less strongly correlated with child maltreatment. Bivariate correlations of education with abuse and neglect reveal that education is negatively associated with maltreatment (i.e., that control mothers had completed significantly more years of schooling than their study counterparts).

Multivariate Analyses

The above associations do not take into account the fact that the variables are interrelated. All subsequent analyses are carried out with logistic regression analysis, using maximum-likelihood estimation. This technique is considered most appropriate when the dependent variable is dichotomous and the independent variables are both categorical and continuous.²⁴ Computations for this study were executed by computer using the SAS logist procedure.²⁵

Because the partial logistic regression coefficients (the logits) do not have a straight-

forward interpretation, we have converted each to an odds ratio by taking its natural antilogarithm. The odds ratio reflects the change in the odds of the dependent variable (child maltreatment) associated with a one-unit change in the independent variable when all other variables are held constant. An odds ratio that is less than one indicates that the independent variable decreases the odds, while an odds ratio that is greater than one indicates an increase.

To determine if unplanned childbearing and large family size increase the risk for abuse and neglect, these two dependent variables were separately regressed on each of the independent variables plus the five maternal background variables, with all six entered into the equation simultaneously.

To determine if multicollinearity affected the estimation of coefficients for the live birth variables, the variance inflation factor* was calculated for each. It indicated that the only analysis with a multicollinearity problem was the test for the interaction between total number of live births and number of unplanned children. Both the neglect and abuse analyses were affected. Of the eight variables included in these analyses, three—number of unplanned live births, number of live births and the interaction between these two—had variance inflation factors that exceeded five. To correct the problem, three new variables were constructed and substituted in the analysis for the three collinear variables. To create the new variables for unplanned live births and number of live births, each was centered (i.e., the mean was subtracted from the value for each respondent). To create the interaction term, the two centered variables were multiplied. The analyses with the three centered variables were free of multicollinearity problems, with a variance inflation factor that was less than two for each variable.

Study Findings

Unplanned childbearing does not appear to be associated with child neglect. The regression findings (see panel 1 of Table 3) reveal that once maternal characteristics are controlled for, the weak zero-order relationship between number of unplanned live births and neglect identified in Table 2 no longer persists.

Unplanned childbearing does, however, appear to increase the risk of abuse. Table 4 reveals that even when maternal characteristics are controlled for, the moderate zero-order relationship between unplanned childbearing and abuse persists. The odds ratio shows that each additional unplanned birth increases the likelihood of abuse by a factor of 1.7. Families with two unplanned children are 2.8 times more likely to abuse than families with no unplanned children, and families with three unplanned children are 4.6 times more likely to abuse than families with no unplanned children.† As might be expected, statistical comparison of the coefficients for the number of unplanned births from the neglect and the abuse analyses with a t-test reveals a significantly stronger relationship between unplanned childbearing and abuse than between unplanned childbearing and neglect ($t = 3.00$).

Large family size increases the risk of neglect: Neglectful mothers had significantly more children prior to the time they were identified as neglectful than had their age-matched counterparts (see panel 2 of Table 3), independent of maternal background characteristics. The odds ratio reveals that each additional child increases the likelihood of neglect by a factor of 1.8; for example, families with three children are 1.8 times more likely to neglect a child than are families with two children. Families with four children, moreover, are 3.4 times more likely to neglect a child than are families with two children.

Large family size also increases the risk of abuse. Abusive families, like neglectful families, had significantly more children prior to the time they were identified than had their age-matched counterparts (see panel 2 of Table 4). The odds ratio shows that each additional child increases the likelihood of abuse by a factor of 2.5: Families with three children are 2.5 times more likely to abuse a child than are families with two children. Furthermore, families with four children are 6.0 times more likely to abuse a child than are families with two children.

Statistical comparison of the abuse and neglect coefficients for family size with a t-test reveals a stronger relationship between family size and abuse ($t = 4.90$) than between family size and neglect. In other words, one additional child in the family has a more pow-

*The variance inflation factor, a diagnostic measure for multicollinearity, will equal one when a variable is uncorrelated with other independent variables; when two or more variables are correlated, the variance inflation factor for each will be greater than one. If the variance inflation factor equals or exceeds five, multicollinearity may be a problem and further assessment is required. (See S. Glantz and B. Slinker, *Primer of Applied Regression and Analysis of Variance*, McGraw-Hill, New York, 1990.)

†These associations are calculated by multiplying the number of children by which the two families differ and the coefficient for the number of live births, and then taking the antilog of this number.

erfu' effect on the probability of the occurrence of abuse than on the probability of neglect.

Hypothesis Testing

Hypothesis Three—that the effect of unplanned childbearing on child maltreatment depends on family size—was tested first, because an interaction must be ruled out before the other hypotheses can be considered, regardless of whether unplanned childbearing and family size are individually associated with maltreatment. Eight variables—number of unplanned live births, total number of live births, a term representing the interaction between these two, and the five maternal characteristics—were simultaneously entered into the equation.

To conclude that the data are consistent with the hypothesis, the interaction term must be statistically significant. However, the results displayed in panel 3 of Table 3 and panel 3 of Table 4 reveal that the hypothesis is not supported for either neglect or abuse; the interaction term is not significant.

Hypothesis One (that family size is an intervening variable with respect to the relationship between unplanned childbearing and child maltreatment) and Hypothesis Two (that large family size and unplanned childbearing independently increase the risk of child maltreatment) were not tested for neglect because unplanned childbearing was not significantly associated with neglect in the previous multivariate analyses.

However, both family size and unplanned childbearing were individually associated with abuse, so the hypotheses must be tested. Thus, seven variables—number of unplanned live births, total number of births, and the five maternal characteristics—were simultaneously entered into the equation.

To conclude that the data are consistent with Hypothesis One, it would be necessary to find that unplanned childbearing fails to

Table 3. Results of three logistic regression analyses of child neglect

Variables	Analyses								
	Unplanned births			Family size			Hypothesis Three		
	Coefficient	Standard error	Odds ratio	Coefficient	Standard error	Odds ratio	Coefficient	Standard error	Odds ratio
Age at first birth	0.004	.070	1.004	0.080	.077	1.083	0.074	.077	1.077
Education	-0.272	.103	0.762**	-0.249	.111	0.780*	-0.255	.111	0.775*
Race	-0.375	.457	0.688	-0.306	.487	0.736	-0.261	.495	0.770
Maltreated as child	0.483	.377	1.638	0.777	.416	2.175	0.801	.419	2.229
Maternal coping	1.784	.372	5.954***	1.800	.389	6.050***	1.806	.393	6.101***
Unplanned birth	0.305	.171	1.357	na	na	na	-0.138	.224	0.871
Family size	na	na	na	0.605	.145	1.832***	0.691	.177	1.996***
Unplanned birth x family size	na	na	na	na	na	na	-0.064	.114	0.938
Intercept	1.864	1.655	na	-1.044	1.835	na	0.709	1.712	na

Note: In this table and Table 4, * $p < .05$, ** $p < .01$ and *** $p < .001$. All analyses are for 188 respondents. The dependent variable is coded: no maltreatment=0; maltreatment=1.

increase the odds of maltreatment significantly, or that its regression coefficient is reduced 20 percent from the analysis of unplanned childbearing (and the five maternal characteristic variables). For the data to be consistent with Hypothesis Two, both family size and unplanned childbearing must significantly raise the odds of maltreatment.

As for abuse, the findings are consistent with Hypothesis One. They show the significant relationship between number of unplanned children and abuse (shown in panel 1 of Table 4) to no longer persist once family size is included in the analysis (see panel 4 of Table 4). This suggests that unplanned childbearing affects the risk of abuse indirectly, through its effect on family size. The finding also rules out Hypothesis Two.

Discussion

The study suggests that unplanned childbearing and family size differ in their effect on the risk of child abuse and neglect in

low-income, female-headed families. Although large family size significantly raises the risk of both types of maltreatment, it has a larger effect on abuse. Unplanned childbearing appears to increase only the risk of abuse. Findings on the relationship of unplanned childbearing, family size and abuse are consistent with the hypothesis that family size mediates the effect of the number of unplanned children on the risk of abuse. Unplanned children lead to larger family size, which increases the risk of abuse.

Even though the design of the study described in this article addresses some of the problems of earlier research, the study is not without limitations. It is important to note these limitations and to caution that these findings must be viewed as tentative. First, the retrospective collection of data on the family planning status of children poses the possibility that findings are a function of biased misclassification. The maltreating respondents, mothers who obviously had

Table 4. Results of four logistic regression analyses of child abuse

Variables	Unplanned births			Family size			Hypothesis Three			Hypotheses One and Two		
	Coefficient	Standard error	Odds ratio	Coefficient	Standard error	Odds ratio	Coefficient	Standard error	Odds ratio	Coefficient	Standard error	Odds ratio
Age at first birth	-0.119	.057	0.888*	0.081	.059	0.922	-0.078	.060	0.924	-0.082	.059	0.921
Education	-0.203	.097	0.817*	-0.185	.101	0.831	-0.170	.102	0.844	-0.185	.101	0.831
Race	-0.639	.456	0.528	-0.606	.478	0.545	-0.792	.500	0.453	-0.607	.478	0.525
Maltreated as child	0.287	.362	1.332	0.355	.379	1.427	0.363	.381	1.438	0.355	.379	1.426
Maternal coping	1.046	.342	2.846**	0.033	.357	2.808**	1.067	.361	2.910***	1.036	.358	2.818**
Unplanned births	0.512	.189	1.669**	na	na	na	0.071	.258	1.073	-0.034	.245	0.967
Family size	na	na	na	0.900	.201	2.459***	0.954	.253	2.595	0.920	.250	2.509***
Unplanned birth x family size	na	na	na	na	na	na	-0.342	.210	0.711	na	na	na
Intercept	3.909	1.474**	na	1.850	1.590	na	0.727	1.510	na	0.869	1.585	na

more trouble coping with their children than had their counterparts in the control group, may have been more likely to retrospectively classify their children as unplanned. Although the negative findings regarding unplanned childbearing and neglect suggest that the results may not be confounded by misclassification, this possibility cannot be ruled out. It is possible that mothers whose children had been abused might differ from neglectful mothers with respect to whether they misclassify their children.

Second, taking the study sample from populations known to child protective services or comparable types of agencies could lead to an overestimation of the differences between maltreating and control families concerning both family size and number of unplanned children. In other words, the maltreating families may have produced at least some of their children (or unplanned children) between the time they began to maltreat and the time they were actually identified as maltreating by protective services. This problem is most likely to affect the neglect findings, since neglect is a chronic, ongoing phenomenon that involves omissions in care and usually does not involve immediate and serious physical harm to the child; it may have gone on for a long time before being noticed and reported to child protective services. On the other hand, the abuse typical of study families tended to involve fairly serious injuries to the victim, and it is therefore unlikely that abuse could have been going on for a protracted period of time without having been reported.

Third, inclusion in the abuse sample of families in which different people were identified as the perpetrator of the abuse presents problems of interpretation. Are the findings representative of all abusive families, or are they only representative of the oversampled component—families in which the mother is the perpetrator?

• *Child neglect.* Unlike two earlier studies,²⁶ this research did not find unplanned childbearing to be a behavior pattern typical of low-income neglectful families. Unplanned childbearing did not increase the risk of neglect, and both neglectful and comparison families included large proportions of unplanned children (50 percent vs. 60 percent).

In light of the design differences between this study and an earlier one²⁷ (which measured the number of unplanned children only at the time of the study interview, an average of 4.7 years after the families had been identified as maltreating), one possible interpretation of the difference in results is that neglectful families continue to produce unplanned children after they have

been identified as maltreating. Tentative analyses of the additional data (not shown) are consistent with this explication: Thirty-five percent had at least one unplanned child between the time they were identified as maltreating and the time of the study interview (also an average of 4.7 years).

Like every other study that has examined the relationship between family size and child neglect, this study also found that large family size increases the risk of neglect, yet findings from this study should be interpreted differently than those of earlier efforts because of design differences. They reveal that at the time the family is first identified as neglecting, it is larger than a comparable age-matched, nonmaltreating family, whereas earlier efforts showed that at the time of the interview, some amount of time after the maltreatment had begun, neglectful families had more children than did their nonmaltreating counterparts.

Given the propensity of neglectful families to continue having children after being identified as maltreating (51 percent of this study's neglectful families had one or more children after being identified as maltreating), this distinction is not a trivial one. Such a high rate of childbearing after the families have already begun to have problems with the provision of adequate care exposes more and more children to the risk of neglect and could be associated with the high rates of recidivism that are typical of neglectful families.²⁸ If the results of this study are replicated by future efforts, they certainly would have important implications for the delivery of services to neglectful families, and would suggest that caseworkers need to help such families prevent the birth of more children. Additionally, current and future researchers on recidivism might be well-advised to examine the effect of the number of children born after identification of maltreatment.

• *Child abuse.* Consistent with findings from the two earlier efforts, both unplanned childbearing and family size are associated with child abuse. Each additional unplanned child results in an increased risk of abuse (by a factor of 1.7); each additional child, regardless of planning status, also increases that risk (by a factor of 2.5). Regarding the relationships among unplanned childbearing, family size and abuse, the results are consistent with the hypothesis that the number of unplanned children is indirectly associated with abuse through family size. In other words, unplanned childbearing leads to larger family size, which in turn adversely affects the adequacy of child care.

Like the neglect findings concerning family size, these results must be interpreted differently than those of the earlier study.

They show that at the time the family is first identified as abusing, they have more unplanned children and larger families than do their nonmaltreating counterparts. (In the previous study, these variables were measured at the time of the interview, an average of 4.2 years after the families had been identified as abusing.) If replicated, these results would suggest that family planning interventions could possibly help to prevent abuse in low-income, female-headed families.

Results of comparisons of abuse and neglect suggest that the two types of maltreatment differ with respect to family size and unplanned childbearing, both of which have a more powerful effect on the risk of abuse than of neglect for the low-income, female-headed families that were the subjects of this study. Each additional unplanned child and each additional child (regardless of planning status) increased the probability of abuse significantly more than the probability of neglect.

• *Research recommendations.* The most strongly grounded recommendation emerging from the findings presented here regards future research. Because previous studies have not built on each other, either methodologically or substantively, drawing conclusions is, at best, very difficult. Thus, replication needs to be the first order of business. Future studies should aim to determine if the findings of this study can be replicated, given the same design characteristics.

Differences in the associations between the two types of maltreatment and unplanned childbearing and family size are hardly surprising: On the basis of distinctive clinical presentations and case worker impressions, theorists have long speculated that at least some of the antecedents of abuse and neglect (such as family characteristics and parental personality characteristics) differ. However, so few studies have separately analyzed data on abusive and neglectful families that we know almost nothing about how these families differ. Replication of the findings of this study will document the importance of constructing separate explanatory theories for the two types of maltreatment and of continuing to examine abuse and neglect separately, along with the potential effectiveness of using family planning interventions for the primary prevention of abuse.

Second, future efforts would greatly advance knowledge if they focused on addressing the following three questions:

• Does family socioeconomic or marital status moderate the effect of unplanned childbearing and family size on the risk of these two types of maltreatment? At best, findings from this study can be generalized only to

low-income, female-headed families; it is possible that results will differ for higher income families or married couples.

• Does the effect of the two characteristics differ as a function of who perpetrated the abuse? We know very little about the maternal and family correlates of abuse perpetrated by different individuals. This study, like many earlier efforts, does not separately examine the correlates of abuse by various perpetrators. Large family size may elevate the risk of abuse by mothers and fathers but not by such perpetrators as mothers' boyfriends, relatives and babysitters.

• Do maternal personality characteristics, particularly coping abilities, condition the effect of family size and unplanned childbearing on the risk of abuse and neglect? Theorists agree that although maltreatment is a complex social problem with multiple determinants, the most important of its antecedents is the status of the mother's enduring psychological resources, and the effect of other hypothesized determinants, such as family size and unplanned childbearing, may depend on the status of these characteristics.²⁹ Consequently, from a theoretical as well as a practical point of view, the interaction between maternal personality and family size needs examining. Only mothers who have poor personal and interpersonal skills may be at risk of maltreating their offspring when confronted with an excess number of children or the presence of unplanned children.

A third recommendation pertains to a methodological issue. Future research that is longitudinal and prospective in nature would greatly help to advance knowledge by ruling out such threats to internal validity as a biased misclassification of child's planning status and the inability to determine when maltreatment first began. Despite the expense of such efforts, it would be optimal to conduct at least a few studies similar to those of Byron Egeland and colleagues.³⁰ At a minimum, such efforts should follow cohorts of families from just before the conception of their first child up to the last child's 18th birthday, collect data on the planning status of each child prior to his or her birth, measure other theoretically important antecedents of child maltreatment (such as maternal personality characteristics and a variety of different types of stresses and strains), and carefully monitor the adequacy of child care in several ways, including in-home observation, teacher evaluations and reports to child protective services. Only through such efforts will we be able to provide definitive answers about the antecedents of abuse and neglect.

Finally, given that recidivism is of great practical concern to the child protection

sector, future studies of this issue should consider assessing the effect of childbearing after the initial incident of maltreatment, particularly neglect, on the risk of reoccurrence.

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Levels of Sexual Activity Among Adolescent Males in the United States

By Freya L. Sonenstein, Joseph H. Pleck and Leighton C. Ku

Summary

Although three-fifths of adolescent males aged 15–19 say they have had sexual intercourse, analyses of data from the 1988 National Survey of Adolescent Males indicate that their level of sexual activity is relatively moderate. The data show that among sexually experienced young men the mean number of partners in the last 12 months is 1.9, and the mean frequency of intercourse in the last four weeks is 2.7 times. Black males have had more partners than white or Hispanic males; however, after the number of years since first intercourse are controlled for, these differences disappear. On average, sexually experienced youth spent six out of the last 12 months with no sexual partner, and only 21 percent of sexually active males had more than one partner in any month in the last year.

Comparisons with 1979 data suggest that proportionately more adolescents were sexually experienced in 1988, but fewer non-black males had first intercourse before their 15th birthday. The number of partners since first intercourse and in the past four weeks appears to have decreased, as has the frequency of intercourse in the last four weeks.

Introduction

In spite of a growing public awareness of the problems of unintended pregnancy, sexually transmitted diseases (STDs) and the human

Young men have surprisingly conservative sexual behaviors and relatively few periods of multiple partners; having more than one partner in a year is generally not a sign of a "sexual adventurer," but of the instability of adolescent relationships.

immunodeficiency virus (HIV), the proportion of sexually active teenagers in the United States appears to have risen during the 1980s. Among young women aged 15–19, the number claiming to have had sexual intercourse grew from 47 percent in 1982 to 53 percent in 1988; among young urban men aged 17–19 the proportion rose from 66 percent in 1979 to 76 percent in 1988.¹ Understandably, these increases—representing proportionately more teenagers at risk of pregnancy and disease—have been viewed with alarm.

If successful strategies are to be developed to reduce exposure to these risks among young people, information beyond simple estimates of the exposed population is needed, including information about such teenage sexual behavior as frequency and types of intercourse, numbers and types of sexual partners, and consistency and types of contraceptive methods used.

There is already evidence that a shift in contraceptive behavior among teenagers may have occurred. The reported use of condoms at first heterosexual intercourse appears to have more than doubled among females between 1982 and 1988, and among urban males between 1979 and 1988. In 1988, just under one half of females and just over one half of males aged 15–19 reported using a condom at first intercourse.* Conversely, the incidence of unprotected first intercourse has declined.²

This article focuses on another key determinant of the risk status of teenagers: their levels of heterosexual activity, as measured by the number of partners and the frequency of intercourse. While all teenagers who have had intercourse at least once are typically des-

ignated "sexually active," some are clearly more active than others. Earlier research on young women has shown that during the 1970s, the proportion of sexually experienced 15–19-year-olds who had had more than one premarital sexual partner increased. In 1971, 38 percent of these females had had two or more partners since they first had intercourse; in 1979, this proportion was 51 percent. Among black females, the increase was steeper—from 39 percent in 1971 to 62 percent in 1979.³ Data from 1988† indicate further increases;⁴ for example, 59 percent of never-married sexually experienced women aged 15–19 reported more than one sexual partner since first intercourse.

Standardized information about trends in the frequency of sexual intercourse is scarce, and, again, only available for young women. Comparisons of never-married females aged 15–19 in 1971 and in 1976 indicate that although the prevalence of sexual intercourse, as well as the number of partners, increased during this period, the frequency of intercourse decreased slightly, from 2.9 to 2.6 times per month.⁵ In both years, intercourse was more frequent among whites

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*Because of differences in coding for the National Survey of Adolescent Males (NSAM) and the National Survey of Family Growth (NSFG), these proportions of male and female adolescents using condoms at first intercourse are not directly comparable. In the NSAM, if a respondent reported using a condom at first intercourse even though an effective female method was also used, he was coded as having used a condom. In the NSFG, this same case would have been coded as using a female method.

†The 1982 NSFG did not ask about the number of lifetime partners, but this question was added to the 1988 Survey.

than blacks. Data from the 1982 National Survey of Family Growth (NSFG) show that 40 percent of sexually experienced adolescent females reported having had intercourse at least once a week. Again, proportions were higher among whites (43 percent) than blacks (32 percent).⁶ By 1988, 45 percent of never-married sexually experienced young women aged 15-19 reported having had intercourse at least once a week during the past three months.⁷

Although data have been gathered periodically since 1971 about young women's sexual activity and contraceptive use, little has been collected about levels of sexual activity among teenage males. The first large-scale national survey of young men's sexual behavior—the National Survey of Young Men (NSYM)—was not conducted until 1979. It provided useful baseline information for U.S. males aged 17-21 living in metropolitan areas. Since then, a few other nationally representative sample surveys have collected information about the sexual activity of young women and men, but none has provided data on numbers of sexual partners or frequency of intercourse.⁸ Young men have often been characterized as having high levels of sexual activity. Terms such as "sexual adventurer," or "roving inseminator," have been used to describe a young male who values and pursues sexual conquests.⁹ Yet exactly how typical is this behavior? This article describes levels of sexual activity in 1988 among U.S. males aged 15-19, using data from the National Survey of Adolescent Males (NSAM), and compares this information when possible with data from the 1979 NSYM.

The NSAM, conducted between April and November 1988, was a nationally representative household survey of 1,880 never-married American males aged 15-19.¹⁰ The survey included young men, both in and out

Table 1. Cumulative percentages of never-married U.S. males aged 15-19 who have had sexual intercourse, by age, according to racial or ethnic group, 1988

Age†	All races‡	Black	White	Hispanic
13	5.4	19.8	2.9	3.9**
14	11.0	34.6	7.1	6.3**
15	21.1	47.8	16.2	19.4**
16	37.8	63.5	33.0	37.7**
17	57.5	78.4	53.0	63.2**
18	67.4	84.7	69.8	60.9**
19	79.0	95.8	75.9	80.5*

†Analyses for ages 16-19 exclude those whose current age is less than or equal to designated age.

‡In this and subsequent tables, "all races" includes "other."

Note: In this table, statistical significance is determined by chi-square tests; significance levels are designated as follows: *p<.05; **p<.001.

of school, who lived with their families or in other types of households. Because it was limited to households, the data excluded some young men who may have been in particularly high-risk groups, such as homeless and runaway youth, as well as those living in institutions, dormitories and military barracks. The overall response rate was 74 percent. The descriptive data and statistical tests presented throughout this paper use weighted data; the multivariate models use unweighted data.*

Levels of Sexual Activity

In 1988, three-fifths of U.S. males aged 15-19 had experienced sexual intercourse and were therefore designated "sexually active." Some had been sexually active since early adolescence; others had become active later. Table 1 shows the cumulative proportions

of young men in 1988 reporting first intercourse by each consecutive year of age.† About five percent said they had had heterosexual intercourse before their 13th birthday, 11 percent by their 14th birthday and 21 percent by their 15th birthday. Approximately 38 percent had had intercourse before they reached age 16, and 58 percent before age 17. By age 19, about 21 percent had not yet had intercourse.

Black adolescents were significantly more likely to report younger ages at first intercourse than were white or Hispanic teenagers. Twenty percent of black males said their first intercourse was before age 13, while only three percent of whites and four percent of Hispanics reported having intercourse by that age. Thirty-five percent of the black males had had intercourse at least once before their 14th birthday, compared with seven percent of whites and six percent of Hispanics. The cumulative proportion of black youth reporting first intercourse was consistently and significantly higher than the proportions of white and Hispanic youth, and black youth were roughly two years ahead of white and Hispanic males in the proportion having sexual intercourse by given ages. For example, the proportion of black youth who had intercourse by their 13th birthday was comparable to the levels for white and Hispanic youth by their 15th birthday.

The sexually experienced young men in the NSAM reported an average of 5.1 sexual partners since they had first had sexual intercourse. The top panel of Table 2 shows the mean number of lifetime sexual partners by age at the time of the interview and by racial or ethnic group.‡ Older respondents report-

Table 2. Mean number of sexual partners since first intercourse and in the last 12 months among sexually experienced, never-married U.S. males aged 15-19, by age, according to racial or ethnic group

Time period and age	All races	Black	White	Hispanic
SINCE FIRST INTERCOURSE	(N=1,251)	(N=553)	(N=440)	(N=228)
15-19	5.11	8.30	4.29	5.15
15	4.10	6.40	3.55	1.98
16	4.25	6.68	3.55	3.66
17	4.76	8.99	3.60	4.23
18	5.51	8.00	4.73	8.43
19	6.12	11.34	5.22	5.80
IN LAST 12 MONTHS	(N=1,262)	(N=559)	(N=444)	(N=228)
15-19	1.92	2.37	1.85	1.57
15	1.92	2.11	2.04	1.13
16	1.93	2.82	1.67	1.87
17	1.77	2.49	1.58	1.52
18	1.90	2.01	1.91	1.82
19	2.08	2.47	2.11	1.39

Note: In tables 2-5, statistical significance is determined by Kruskal-Wallis test; for "all races," differences by age in number of sexual partners since first intercourse are significant at p<.01 and differences by age in number of sexual partners in last 12 months are significant at p<.001; for 15-19-year-olds, differences by racial or ethnic group in numbers of sexual partners since first intercourse and in last 12 months are significant at p<.001.

*The weights (which average to 1.0 overall) adjust for sampling stratification, screening nonresponse, interview nonresponse, and post-stratification adjustment aligning the sample with the March 1987 Current Population Survey.

†The cumulative proportions for young men's first intercourse are calculated using a life-table approach. All respondents are included in computing the share of those who had intercourse before the 15th birthday, since the sample includes 15-19-year-olds. However, analyses for those having first intercourse by their 16th birthday include only those who were 16 or older in 1988, since those age 15 have not completed their 15th year of life. The unweighted sample sizes are 1,490 young men who had intercourse by age 16, 1,095 by age 17, 665 by age 18, and 276 by age 19.

‡Nonparametric statistical tests are used in our analyses since the distributions in the sample on the variables of interest were highly skewed. (See: J. D. Gibbons, *Nonparametric Methods for Quantitative Analysis*, 2nd ed., American Sciences Press, Columbus, 1985.)

Table 3. Mean number of sexual partners and mean number of acts of intercourse in the past four weeks among sexually experienced never-married males aged 15-19, by race or ethnicity and age

Race and age	Number of partners	Number of acts of intercourse
All	0.57	2.56
Age		
15	0.52	1.79
16	0.60	2.20
17	0.65	2.19
18	0.72	3.10
19	0.75	3.45
Race		
Black	0.80	2.32
White	0.64	2.75
Hispanic	0.61	2.85

Note: Differences in number of partners significant across racial or ethnic groups at $p < .05$; differences in number of partners significant across age-groups at $p < .01$; and differences in number of acts of intercourse significant across age-groups at $p < .001$.

ed significantly more sexual partners than did younger ones. Black respondents reported significantly more sexual partners than did whites or Hispanics: Overall, young black men had had 8.3 partners compared to 4.3 among white respondents and 5.2 among Hispanic respondents. Since black youth were likely to have had their first sexual intercourse earlier than white or Hispanic youth, the greater number of sexual partners among sexually experienced black males is not surprising.

The bottom panel of Table 2 presents the mean number of partners reported in the last year by age and by racial or ethnic group. Overall, sexually experienced young men reported a mean of 1.9 partners in the last 12 months. Sexually active 19-year-olds reported the highest number of partners, with a mean of 2.1; those aged 15, 16 and 18 each reported a mean of 1.9 partners; and 17-year-olds reported the lowest mean number of partners, 1.8. These differences, although statistically significant, are not very large. Black respondents reported significantly more partners in the last 12 months (2.4 on average) than did whites or Hispanics (1.9 and 1.6, respectively).

Table 3 shows the mean number of partners and acts of intercourse in the past four weeks as reported in 1988 by all sexually experienced respondents. The young men reported an average of 0.7 partners in the previous month. This number is low because 42 percent of the "sexually active" respondents

had not had intercourse during this time. The number of partners in the past month increases significantly with age, from 0.5 for sexually active 15-year-olds to 0.8 for 19-year-olds. Within the last four weeks, black respondents reported significantly more partners than did white or Hispanic youth.

Sexually experienced young men reported having intercourse an average of 2.7 times in the last four weeks. The frequency of intercourse in the past month increased significantly with age. Fifteen-year-olds reported having intercourse an average of 1.8 times; 19-year-olds reported an average of 3.5 times. Young black men did not vary significantly from young white or Hispanic men in their answers to this question. Thus, although the sexually active black respondents reported significantly more partners—ever, in the last 12 months and in the last four weeks—than did white or Hispanic respondents, their frequency of intercourse in the last month was comparable. Using other data about all partners in the last year, we have estimated that sexually active males had an average of 23 acts of intercourse in the last 12 months.¹¹

Another indicator of sexual activity is the extent to which sexually experienced males have relationships with multiple partners simultaneously. Based on information about the first and last months of a respondent's sexual relationships with his six most recent partners in the last year, we constructed an estimate of the number of months in the previous year in which he had no sexual partners, one partner or more than one partner.* Although the number of months spent in each category can

be viewed as measuring periods of sexual activity, it is more accurate to view them as estimated periods of time spent in a sexual relationship, because intercourse within a relationship could be episodic. For example, a youth who had intercourse a few times with a partner, over a period of time from January to December, would be viewed as having had a sexual relationship with that partner for 12 months, although during much of that period these two would have had no sexual contact.

On average, the sexually experienced respondents aged 15-19 reported spending about half of the last year (5.9 months) with no sexual partners (Table 4). This number decreased significantly with the age of the respondent. Sexually active 15-year-olds reported spending an average of 7.8 months with no partners; 19-year-olds reported an average of 4.3 months. There were also significant differences by race and ethnicity, with Hispanic respondents reporting a significantly higher number of months without a sexual partner (6.9) than blacks or whites (5.8 months each). It appears that once young men have their first intercourse, the majority do not continue to have sexual intercourse on a regular or year-round basis; only 20 percent of the sexually active males said they had had a sexual partner in each of the preceding 12 months.

Very few of the sexually active respondents in the NSAM appear to have been involved in simultaneous sexual relationships. Seventy-nine percent of sexually active young men reported having had no multiple sexual relationships in any of the last 12 months (not shown); five percent reported mul-

Table 4. Mean number of months in the last year in which sexually experienced, never-married U.S. males had no sexual relationships, and mean number of months in which they had two or more sexual relationships, by racial or ethnic group and current age

Number of relationships and age	All races (N=1,222)	Black (N=542)	White (N=427)	Hispanic (N=223)
NO RELATIONSHIPS				
15-19	5.87	5.78	5.75	6.92
15	7.78	7.64	8.34	7.82
16	7.06	6.12	7.12	8.72
17	6.07	5.75	5.94	7.21
18	5.49	4.97	5.40	5.65
19	4.29	4.77	5.07	6.13
≥2 RELATIONSHIPS				
15-19	0.77	1.15	0.71	0.44
15	0.53	0.66	0.59	0.04
16	0.57	1.27	0.34	0.60
17	0.52	1.19	0.35	0.34
18	0.87	1.45	0.77	0.56
19	1.18	1.01	1.31	0.60

Note: For "all races," differences by age in number of months respondents had no relationships significant at $p < .001$ and in number of months respondents had two or more relationships significant at $p < .05$; for 15-19-year-olds, differences by racial or ethnic group in both categories significant at $p < .01$.

*For the 45 cases who had more than six partners in the last year, we imputed estimates of activity based on the number of partners reported and the patterns for the third through sixth-to-last partners. When there were serious discrepancies between the number of partners in the last year and dates of relationships, cases were coded as missing.

multiple partners in six or more months out of the last 12; and only 0.4 percent reported multiple partners in each of the past 12 months. On average, the respondents spent 0.8 months having sexual relationships with at least two partners in the same month (Table 4). Black respondents reported a significantly higher average number of months spent in multiple relationships (1.1) than whites (0.7) or Hispanics (0.4). The mean number of months with one partner can be calculated as the residual of the 12 months not shown in Table 4 (12 months minus months with no partner and minus months with multiple partners equals months with one partner).

Multivariate Analysis

The preceding bivariate analyses demonstrate that ethnicity, as well as current age, can be associated with sexual activity levels. However, it may be useful to consider a developmental perspective: "Volume" or level of sexual activity—either in the number of partners or frequency of intercourse—may be related more to length of time a young man has been sexually experienced than to his current age or race, since a longer time creates more opportunity to accumulate partners.

Consequently, since older respondents, on average, have longer periods of sexual experience than younger ones, their higher levels of sexual activity—measured by their greater number of partners since first intercourse and in the past month, and higher frequency of intercourse in the past month—may reflect greater accumulated experience rather than chronological age differences. Similarly, while black youth reported significantly more partners (for any time period) than did white or Hispanic males, they also reported having first intercourse at younger ages than white or Hispanic respondents. Thus the racial differences in reported sexual activity levels may also reflect differences in the average lengths of time since first intercourse.

We sought to analyze these issues using multivariate models that included years since first intercourse, current age, mother's education (as a socioeconomic control) and race. Our goal was to predict the number of lifetime partners, the number of partners in the last year and in the last four weeks, and the frequency of intercourse in the last four weeks. Table 5 presents the results of ordered logistic regression models.* For the number of lifetime partners and number of partners in the last 12 months, years since first intercourse is a robust predictor. Conversely, the respondent's current age and his race or ethnicity are no longer significant. However, the effects of racial or ethnic differences do not fully disappear in these models. If a respondent was a member of the

Table 5. Regression coefficients (and t-ratios) for characteristics predicting levels of sexual activity among never-married sexually experienced 15–19-year-old males, by characteristic

Characteristic	Number of lifetime partners† (N=1,155)	Number of partners in last 12 months‡ (N=1,155)	Number of partners in last four weeks§ (N=1,155)	Number of acts of intercourse in last four weeks¶ (N=1,155)
Years since first intercourse	.61 (20.67)	.18 (6.41)	.16 (5.69)	.19 (7.02)
Current age	-.04 (-.81)	-.03 (-.77)	.14 (2.86)	.17 (3.66)
White‡‡	-.19 (-1.51)	-.20 (-1.56)	-.20 (-1.46)	.07 (.53)
Hispanic‡‡	-.31 (-1.89)	-.37 (-2.32)	-.45 (-2.59)	-.30 (-1.84)
Other‡‡	-1.26 (-2.66)	-.79 (-1.70)	-.94 (-2.22)	-.70 (-1.87)
Mother's education	.01 (.49)	.02 (.71)	.04 (1.61)	.03 (1.41)
Mother's education missing§§	-.05 (-.14)	-.05 (-.14)	.38 (1.08)	.39 (1.18)

†Categorized as 1 partner=0; 2–3 partners=1; 4–9 partners=2; ≥10 partners=3.

‡Categorized as 0 partner=0; 1 partner=1; 2–3 partners=2; ≥4 partners=3.

§Categorized as 0 partner=0; 1 partner=1; 2 partners=2; ≥3 partners=3.

¶Categorized as 0 acts=0; 1 act=1; 2–3 acts=2; ≥4 acts=3.

‡‡Racial/ethnic groups are contrasted to black non-Hispanic males.

§§Mother's educational attainment was not known by 203 respondents.

Note: All coefficients with positive t-ratios of ≥1.96 and negative t-ratios of ≤-1.96 are significant at p<.05.

"other" category (including Asian, Native American or Pacific Indian), his number of lifetime partners was lower than that of black respondents, and if the respondent was Hispanic, his number of partners in the last 12 months was lower than that of black respondents. The respondent's socioeconomic status as measured by his mother's education has no independent association with the number of partners he has had.

The number of years since first intercourse remains a highly significant predictor for the measures of recent sexual activity levels: number of partners and number of acts of intercourse in the last four weeks. However, in these models, the current age of the respondent is also a significant determinant. Again, while the differences between blacks and whites seen in the bivariate tabulations disappear, Hispanics and respondents in the "other" category have significantly fewer partners in the last four weeks than do black respondents.

These analyses suggest that black males may have more partners than nonblack males because they begin their sexual careers earlier; in other words, we would expect similar numbers of partners for a black youth and a white youth if they first had intercourse at the same age. The findings also suggest that older respondents are likely to have higher levels of recent sexual activity than younger respondents, regardless of when they first started having sex.

Changes, 1979–1988

To examine trends in sexual activity our 1988 data can be compared to the results of the 1979 NSYM. Only 17–19-year-olds liv-

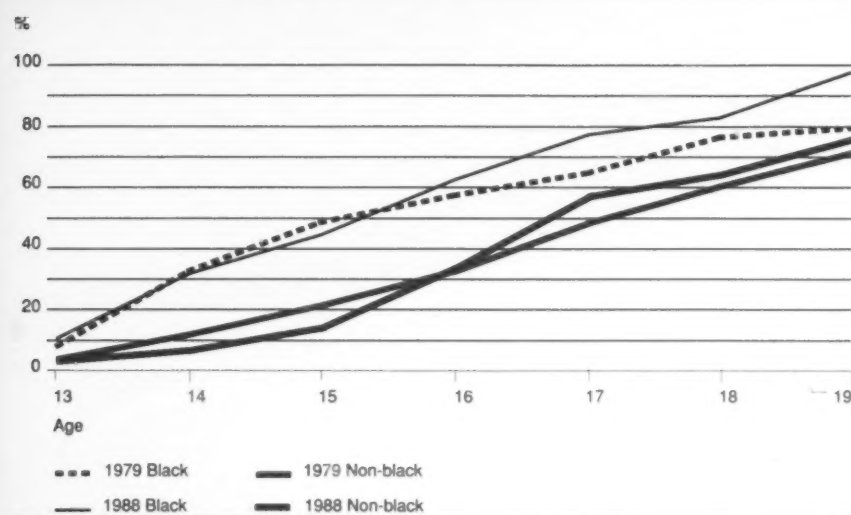
ing in metropolitan areas can be included in this analysis, however, and the results of these comparisons should be interpreted cautiously because any observed differences may be the result of variations in survey design rather than real changes occurring over time.†

Figure 1 (page 166) compares black and nonblack males aged 17–19 at the time of the interviews to ascertain the cumulative proportions who first had intercourse before their 13th through 19th birthdays.‡ More young men had had intercourse by age 18 or 19 in 1988 compared to 1979, but the pattern is somewhat complex. For nonblack males, the proportion who had intercourse before their 15th birthday is significantly lower in 1988 than in 1979 (as determined by chi-square test). Starting at the 17th birthday, the trend reverses and the proportion of nonblack males who have had intercourse is higher in 1988. Among black males, the proportions

*Since the dependent variables are highly skewed, we estimated ordered logit models, which yielded similar findings. (See: G. Maddala, *Limited-Dependent and Qualitative Variables in Econometrics*, Cambridge University Press, London, 1983).

†Some of the potential design differences between the two surveys have been controlled for, as the same survey firm conducted the study in 1979 and 1988. However, other differences remain; for example, sexual activity information was solicited in a self-administered format in 1979, and by the interviewer in 1988. (See: F. L. Sonenstein, J. H. Pleck and L. C. Ku, 1989, reference 1, and —, 1989, reference 10.)

‡These data were computed using a lifetable approach. The data set for the 1979 survey in the Data Archive on Adolescent Pregnancy and Pregnancy Prevention codes race as black or nonblack; other racial or ethnic breakdowns are not available.

Figure 1. Cumulative proportion of never-married metropolitan-area males who had had intercourse before each age, by race, 1979 and 1988

having first intercourse before their 15th birthday were similar in 1988 and 1979. Again, significantly more black young men had had intercourse by their 17th birthday in 1988 compared to 1979.

Table 6 compares responses by age and race for levels of sexual activity measured in both the 1979 and 1988 surveys. Young men reported significantly fewer sexual partners since first intercourse in 1988 than they did in 1979—6.0 partners compared with 7.3. The analyses by race show that this statistically significant finding is restricted to nonblack respondents. While blacks reported an equally high number of partners in the two surveys (9.3 in 1979 and 10.0 in 1988), nonblack respondents reported a lower number of partners in 1988 (6.9 in 1979 and 5.0 in 1988).

Compared to the respondents in the 1979 National Survey of Young Men, NSAM respondents report significantly fewer partners in the last four weeks—an overall mean of 0.7 in 1988 versus 1.0 in 1979. Further analysis by race suggests that the biggest difference occurred among the black respondents, whose number of partners in the last four weeks fell from 1.3 in 1979 to 0.9 partners in 1988. Intercourse in the last four weeks was also less frequent in 1988. The difference between the surveys was just significant at the 0.05 level and none of the comparisons between the two surveys across age groups or racial groups was statistically significant. Breakdowns by age also showed no statistically significant differences between 1979 and 1988, except among 19-year-olds.

One possible explanation for the reduction in measures of sexual activity is that first intercourse is occurring later. Other possi-

ble factors include awareness of the risks of intercourse—including HIV infection—and corresponding changes in sex education over the past decade, or larger shifts in U.S. culture such as the redefinition of gender roles or increased conservatism.

Conclusions

In much research and policy discussion on teenage sexuality, the only social indicator used is whether teenagers have had intercourse or not. The data presented here clearly indicate a more complex picture. Although sexual activity levels among U.S. adolescent males appear high—60 percent have experienced intercourse at least once—the majority of them have relatively low levels of sexual activity, measured in terms of number of partners and incidence of intercourse.

On average, sexually active males aged 15–19 spend half a year with no sexual partner, and only 20 percent reported carrying

on more than one relationship simultaneously during any of the past 12 months. This picture contrasts sharply with a common view of young men as “sexual adventurers,” a term coined almost 20 years ago by Robert Sorensen to describe adolescents who seek many partners.¹² Using 1972 survey data, he estimated that 42 percent of sexually active young men had simultaneous partners, compared with only 13 percent of sexually active young women. Our 1988 data indicate that only 21 percent of sexually active young men had more than one partner in any month out of the last year and only five percent reported having multiple partners for six or more months out of the last 12. A frequently occurring pattern among those with more than one partner in the last year is serial monogamy, a pattern of monogamous relationships that follow one another.

Analyses of the 1988 General Social Survey of Americans aged 18 and older indicated that 18–24-year-olds are less monogamous than older adults and that men are generally less monogamous than women. (These analyses defined monogamy as having only one partner in the last year among those sexually active, or having zero or one partner in the last year among all persons.)¹³ Our data indicate that young men have surprisingly conservative sexual behaviors and have relatively few periods of multiple partners. Among adolescents, having more than one partner in a year is generally not a sign of a “sexual adventurer,” but of the instability of monogamous adolescent sexual relationships. A typical picture of an adolescent male’s year would be separate relationships with two partners, lasting a few months each, interspersed with several months without any sexual partner.

With the advent of AIDS, it has become very important to track levels of sexual activity more precisely among teenagers. We must also move beyond the traditional approach of simply distinguishing between

Table 6. Among single, sexually active metropolitan-area males aged 17–19, mean numbers of sexual partners and acts of intercourse, by race and age, according to year

Race and age	Partners since 1st intercourse		Partners in last four weeks		Acts of intercourse in last four weeks	
	1979	1988	1979	1988	1979	1988
All	7.34	6.00***	0.96	0.72*	4.60	3.02*
Race						
Black	9.34	9.99	1.32	0.86**	3.64	2.62
Nonblack	6.87	5.02**	0.87	0.68	4.83	3.13
Age						
17	6.19	5.21	0.82	0.69	3.02	2.49
18	6.68	6.02	0.93	0.68	4.07	2.97
19	9.02	6.93*	1.11	0.79	6.51	3.80

Note: “Black” includes Hispanic and non-Hispanic blacks; “nonblack” includes all others; significance in this table determined by Mann-Whitney, 1-tail test; significance levels designated as follows: *p<.05, **p<.01 and ***p<.001.

those who have had intercourse and those who have not. Reliable data about the number of sexual partners, the frequency of intercourse, and the consistency of condom use are necessary for estimating the risks of sexual transmission of HIV infection and STDs, as well as the risk of pregnancy. Only when these data are systematically and periodically collected for both men and women will we be able to track changes in risk status over time.

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Intergenerational Transmission Of School-Age Parenthood

By Sarah McCue Horwitz, Lorraine V. Klerman, H. Sung Kuo and James F. Jekel

Summary

A long-term follow-up of a group of black New Haven women who were young mothers in the late 1960s revealed that the majority of their offspring had not become parents by age 19. The offspring who experienced early parenthood were most likely to be female and to report significant depressive symptoms. Of those children—both male and female—who did become young parents, many were the offspring of women who had moved out of their mothers' homes within 26 months of the child's birth, and of women who reported suffering from lifetime depression. The data indicate that emotional deprivation, particularly at an early age, may predispose adolescents to seek emotional closeness through sexual activity and early parenthood.

Introduction

Teenage pregnancy in the United States continues to be a significant social issue. Each year, one in every 10 young women aged 15–19 becomes pregnant; approximately half of these become school-age mothers.¹ Although over the last 10 years, more young women have remained in school while they are pregnant and returned to school after delivery,² early pregnancy and parenting remain a major reason for dropping out of high school. Young parents face social and economic hardships in addition to educational problems. If they marry young, their divorce rates are high. If they are self-supporting, their incomes tend to be low and they often hold low-prestige jobs. If they neither marry nor secure jobs, they can become welfare-dependent.³

Previous research has revealed a number of key antecedents of school-age parenthood.

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"Many of the offspring who became young parents were removed from their grandmothers' homes before the age of two, losing caretakers intimately involved in their physical and emotional well-being."

Teenage parents are likely to have been unsuccessful academically, to have had their first sexual intercourse early, to report little and inconsistent contraceptive use, to exhibit multiple problem behaviors and to come from disadvantaged families. Often these families are large, headed by females and poor.⁴ Some recent work has shown that young parents are also likely to come from families in which the mother was sexually active at a young age or was herself a young, unmarried parent; thus, the children appear to perpetuate a family history of school-age parenthood.⁵

How convincing is the evidence that suggests an intergenerational transmission of school-age parenthood? Susan Newcomer and J. Richard Udry found that daughters of mothers who were early initiators of sexual intercourse were more likely to have begun sexual relations early themselves, but their studies found no attitudinal, behavioral or interpersonal communication patterns that explained the results.⁶ Harriet Presser reported that daughters of teenage mothers were more likely to be young parents, but provided little theoretical explanation.⁷ Similarly, Josephine Card's work showed a slight tendency for children of young mothers to become young parents.⁸ However, few of these studies introduced controls for social and demographic factors shared by mothers and daughters that might account for the findings. A study by Joyce Ladner that introduced such controls found that the effect of mother's age at first birth on her children was reduced, suggesting that within certain social or demographic groups, young parenthood may be an acceptable means to achieving adult status.⁹

Being born to a school-age mother is also

associated with early parenthood in males. Using 100 young male parents and 100 age-matched nonparent peers, Frederick Rivara and coauthors found few differences in social or demographic characteristics or in scores on a self-image questionnaire. However, the young fathers were 1.5 times more likely than their nonparent peers to have a mother who was a teenage parent.¹⁰ Similar findings were reported in another study comparing young male parents to their nonparent peers.¹¹

Given the number of studies finding that mothers' age influences age at parenthood in offspring, one would expect that, within a cohort of children born to adolescent mothers, many would become young parents themselves. Yet in one of the few longitudinal data sets available, Frank F. Furstenberg, Jr., and colleagues recently found that most did not, although the rate of young parenthood was higher in their group of Baltimore youth born to young mothers than in youth born to older mothers in the National Survey of Children.¹²

The research reported here documents the prevalence of school-age parenthood among a cohort of youth born to adolescent mothers, and explores antecedent factors predicting early parenthood. Our findings may help determine which of three alternative theories of school-age childbearing is most relevant: the psychological explanation, which suggests that adolescents who experience emotional deprivation and depression are most likely to become young parents; the "problem behavior" explanation, which suggests that young parenthood is the outgrowth of a number of socially deviant behaviors; and the "alternate lifestyle" explanation, which contends that young parent-

hood is a means for achieving womanhood, particularly among young females who experience obstacles in other paths to adulthood.¹³

Methods

The data for these analyses are from a follow-up to a long-term investigation of a cohort of women who became young mothers in the late 1960s. The original population consisted of 180 unmarried, pregnant 13-18-year-olds who enrolled from September 1967 through June 1969 in The Young Mothers Program (YMP) in New Haven, Connecticut, run by Yale New Haven Hospital and The New Haven Board of Education. Medical services continued after birth through the hospital's adolescent clinic, and the educational component lasted until the end of the school semester when the baby was born. The YMP was one of the first programs for pregnant teenagers in the United States to include obstetrical, social service and educational components.¹⁴ The follow-up study has excluded 11 women from the original cohort who were white or Hispanic, 12 who were giving birth to a second or third child at the time of their enrollment and three whose children died before reaching one year of age. In addition, 21 of the original enrollees could not be located, seven refused to participate in the follow-up study and five had died.

The remaining 121 black women who were unmarried at the time of first birth gave us permission to contact their oldest adolescent or young adult child (the one born during the original study). Six of these offspring could not be located, two could not be interviewed and two refused to participate, leaving a group of 111 offspring born to school-age mothers served by the YMP program.

Baseline information, collected as part of the original program in the late 1960s, consisted of interviews with the pregnant adolescents at the time of program entry, as well as follow-up data collected at three, 13 and 26 months postpartum. In addition, data were available from the participant's medical, educational and YMP records.

Program entry information consisted of personal and family data, both social and demographic, including age, grade in school, household composition and family welfare status; extensive health information, especially regarding pregnancy; and program-related variables such as the number of YMP "life skills" sessions attended, medical appointments kept, and educational aspirations.

Information collected at the postpartum visits included data on the main program outcomes: educational status, employment, and fertility control (including contraceptive use). The participants were also ques-

tioned about educational aspirations and the structure of social networks (specifically their size and any change in composition). Finally, two subscales were included from an instrument created to measure feelings of social isolation and powerlessness.¹⁵ Women who scored high on the social isolation scale reported little social support and felt they were alone in the world, with few people to call upon in times of need; women who scored high on the powerlessness scale felt that they were not in control of their own lives.

Twenty years after the study participants entered the YMP, 90-minute, semistructured interviews were conducted with the former young mothers and their oldest offspring. When possible, information obtained in these interviews was cross-checked with data from medical and educational records.

Social and demographic characteristics that were examined for both the mothers and offspring included sex, current age, household composition, and personal and household income, as well as marital, employment and welfare histories.

Health status, attitudes and beliefs were analyzed using questions developed for the Rand Health Insurance Study.¹⁶ Questions on chronic health problems and use of medical care were taken from the National Health Interview Survey.¹⁷ Sexual and reproductive history questions were adapted from those used by Furstenberg and colleagues, as were additional questions on significant relationships with men, including abuse incidents and parent-child relationships.¹⁸

Psychological distress was measured using the depression and substance abuse scales of the Diagnostic Interview Schedule.¹⁹ Social stressors were divided into two types, acute and chronic. Acute life stressors were adapted from the Recent Life Changes Questionnaire²⁰ and primarily included such traumatic events as the death of a parent. A measure of chronic life strains was adapted from Leonard Pearlin²¹ and concentrated on stresses concerning neighborhood environment and finances.

Two additional measures were collected on the offspring only: A measure that assessed the degree to which these adolescents believed that events in their environment were under their control,²² and a measure of self-esteem that was based on the scale by Susan Harter.²³

Social network measures examined structural characteristics of the mother's personal social network, including its size, proximity and intimacy and the woman's tendency to call on others for assistance. Given our interest in the social etiology of teenage pregnancy, we asked questions about those activities that commonly link individuals to society,

including religious involvement, social group affiliations and the use of social programs.²⁴

The outcome variable for bivariate and multivariate analyses was whether or not the offspring became school-age parents, defined as having delivered or having fathered a live child before the age of 19.*

Results

The offspring ranged in age from 17 to 20 years, and 58 percent were male (Table 1, page 170). In response to yes or no questions about their living arrangements, 62 percent of the young adults said they lived with their biological mothers, seven percent said they lived with their biological fathers and 14 percent said that an adult male other than their father lived in the household. Thirty-nine percent of this cohort either had been pregnant or had impregnated someone; 25 percent of these young men and women had delivered or fathered a living child; the rest had either aborted or miscarried the pregnancy. Most of these live births (68 percent) were to offspring younger than 19 years.

Overall, 17 percent of the entire cohort—25 percent of the females and 11 percent of the males—had become parents before age 19. Because the age of the male offspring's child was not ascertained unless the child was living with him, some of the 19-20-year-olds may have 1-2-year-old children they fathered before age 19; hence 11 percent represents a very conservative estimate. If every male who reported fathering a child did so before age 19, this estimate would be 23 percent. Eighty-three percent of the cohort had graduated from or was in high school at the time of the interview, and 74 percent were working at least part-time. Many of the offspring (60 percent) reported frequent contact with their grandmothers.

Regarding behavioral and psychological characteristics, 35 percent of the offspring

*Bivariate and multivariate analyses were done using the computer program package Statistical Analysis System. For bivariate analyses, depending on the form of the independent variable, the t-test or chi-square was used. All major constructs previously described were considered in the bivariate analyses. For multivariate analyses, because the dependent variable—school-age parenthood—is dichotomous, a linear logistic regression model was estimated. Independent variables were entered by chronological category, beginning with program entry variables, then three-, 13- and 26-month postpartum factors and then variables from the 20-year follow-up interviews. Model building initially used the variables most highly correlated with school-age parenthood in the bivariate analysis but subsequently considered all independent variables. Once the main effects model was completed, interactions were tested among all main effects in the model, among variables related to young parenthood in the bivariate analyses but not retained in the model and all model main effects, and among interactions suggested by previous research.

smoked, 50 percent became sexually active before age 14, and 41 percent reported usually having intercourse without using contraceptives. Forty-five percent of these adolescents had repeated a grade in school, while 64 percent had been suspended at some point in their academic careers. Thirty percent reported experiencing considerable peer pressure to use drugs and alcohol; 41 percent reported delinquent activities (such as badly beating another individual or stealing a major item); and 14 percent had been incarcerated.

Fifty-six percent of the cohort reported feeling extremely close to their mothers; 55 percent reported feeling this way about their grandmothers. Six percent met the American Psychiatric Association's criteria for drug or alcohol abuse. Significant depressive symptoms were reported by 25 percent of the cohort, with five percent meeting the American Psychiatric Association's criteria for major depression. Using the standardized measures, we found that 37 percent of this cohort believed events in their environment were under their control, and 37 percent exhibited low self-esteem.

Baseline data on the 111 mothers of the offspring²⁵ indicate that by 26 months postpartum, 35 percent had returned to or completed high school and had had no second pregnancy. Fifty-seven percent of the women reported high educational aspirations, and 13 percent reported at the 26-month interview that they were living alone. At the study follow-up, we found that 66 percent of the former young mothers were unmarried, 72 percent had completed at least high school and 80 percent were employed. Altogether, 61 percent had completed high school or obtained a high school equivalency diploma and were economically self-sufficient through employment or marriage.

The results of the bivariate analyses predicting school-age parenthood in offspring under 19 years old are shown in Table 2. Early maternal factors related to young parenthood included not planning to complete high school—in other words, having low educational aspirations—and living alone at 26 months postpartum. Follow-up maternal predictors included major lifetime depression and not having achieved a high school education and economic independence. Five factors were predictors among all offspring: being female, having significant depressive symptoms, having low self-esteem, experiencing high peer pressure to use drugs and alcohol, and not living with one's biological mother. Additional predictors related to school-age parenthood for female offspring only included engaging in delinquent activities, beginning sexual relations before age 14 and being a high school dropout.

Table 1. Number and percentage of offspring of school-age mothers, by characteristic (N=111), New Haven, 1987-1989

Characteristics	N	%
SOCIAL AND DEMOGRAPHIC		
Age and sex		
17-18	58	52
19-20	53	48
Male	64	58
Residence		
Living with biological mother	69	62
Living with biological father	8	7
Living with another male	15	14
Pregnancies and births		
Pregnant or impregnated someone	43	39
Delivered or fathered ≥1 children	28	25
Delivered or fathered before age 19	19	17
Females	12	25
Males	7	11
Other		
Graduated or in school	91	83
Currently working	81	74
Has frequent contact with grandmother	67	60
BEHAVIORAL AND PSYCHOLOGICAL		
Smokes	39	35
Sexually active before age 14	56	50
Usually has sex without using contraceptives	34	41
Repeated grade in school	50	45
Suspended from school	71	64
Feels peer pressure to use drugs and alcohol	33	30
Engaged in delinquent activities	45	41
Has been incarcerated	16	14
Extremely close to mother	62	56
Extremely close to grandmother	61	55
Has abused alcohol or drugs	7	6
Reports depressive symptoms	28	25
Believes events in life are under his or her control	41	37
Exhibits low self-esteem	40	36

We entered the four maternal variables and two of the offspring variables—being female and having depressive symptoms—into a logistic regression model. Depression among offspring was included because, by comparing the age at which the first depressive symptoms were reported to the age at the beginning of the pregnancy leading to the first live birth, we discovered that the depressive symptoms experienced by offspring predated their own or their partner's pregnancy. The remaining child variables—low self-esteem, not living with one's biological mother, and experiencing high peer pressure to use drugs and alcohol—were excluded from the logistic modeling because we could not establish that they predated school-age parenthood. Once interactions were tested, four variables—maternal living situation at 26 months postpartum, maternal depression, depressive symptoms in offspring and the sex of the offspring—remained

in the model (Table 3). Given the relative rarity of maternal depression (11 percent) and the small number of subjects available for the analyses, we relaxed the traditional standard (a significance level of $p < .05$) for inclusion in the model. Odds ratios for school-age parenthood ranged from a low of 2.6 for depressive symptoms among offspring to a high of 3.1 for the mother's having lived alone at 26 months postpartum. However, there were no significant interactions.

Three additional variables had shown elevated risks of school-age parenthood among female offspring only: engaging in delinquent activities, having sex before age 14 and dropping out of high school. However, only one, having sex before age 14, clearly predated the outcome. Because a logistic regression model for females only was extremely unstable due to the small numbers, we created a risk index for the female offspring. A series of cross-stratifications showed that the three remaining variables from the previous analyses—mother living alone, mother depressed and offspring depressed—plus sexual intercourse before age 14, operated independently. Each variable was scored as "1" if present and the score for each female offspring consisted of the sum of these four variables (possible score range, 0-4). Rates of school-age parenthood ranged from a low of 15 percent when no factors were present to a high of 60 percent when two factors were present. When compared with young women with no predictors, those with two predictors were 4.1 times more likely to become school-age mothers.

Discussion

Our data indicate some social and emotional factors in the environments of young adults that may have more association with young parenthood than whether or not one was the offspring of a teenage parent. Within this cohort of offspring born to school-age mothers, the majority of whom delayed childbearing beyond high school, there was a group that had experienced a significant amount of emotional loss. Many of the offspring who became young parents were removed from their grandmothers' homes before the age of two, losing caretakers intimately involved in their physical and emotional well-being. Had the former young mothers left their mothers' homes because of marriage, there was a chance that their children could have developed a nurturing relationship with the new partner. However, most of these women left their mothers' homes because of interpersonal problems or the birth of another baby.

The second source of emotional loss in this second generation of young parents was the lifetime depression reported by

Table 2. Number of offspring of school-age mothers with and without various characteristics predictive of early parenthood, percentage experiencing early parenthood, and relative risk (RR) among offspring with predictor, by sample

Predictor characteristics	Total sample (N=111)					Females only (N=47)				
	With characteristic		Without characteristic		RR	With characteristic		Without characteristic		RR
	N	% early parents	N	% early parents		N	% early parents	N	% early parents	
Of mothers										
Low educational aspirations while in YMP	47	25.5	63	11.1	2.3	21	29.0	25	24	1.2
Lived alone at 26 months postpartum	12	33.3	80	13.8	2.4	3	67.0	38	21	3.2
Suffers from depression	12	33.3	98	14.3	2.3	4	50.0	43	23	2.2
Did not finish high school/is not economically independent	43	20.9	67	13.4	1.6	22	32.0	25	20	1.6
Of offspring										
Female	47	25.5	64	10.9	2.3	na	na	na	na	na
Reports depressive symptoms	28	28.6	83	13.3	2.2	10	40.0	37	27	1.5
Exhibits low self-esteem	40	22.5	71	14.1	1.6	14	36.0	33	21	1.7
Feels peer pressure to use drugs/alcohol	33	24.2	78	14.1	1.7	15	40.0	32	19	2.1
Not living with mother	35	25.7	69	11.6	2.2	14	50.0	30	13	3.8
Engaged in delinquency	na	na	na	na	na	8	50.0	39	21	2.4
Had sex before 14	na	na	na	na	na	6	50.0	36	22	2.0
High school dropout	na	na	na	na	na	6	50.0	41	22	2.3

Note: In this and subsequent table, na=not applicable.

their mothers. The women in this study usually reported depression that had begun during their adolescent years. Depressed mothers are often described as cold, unavailable and lacking in affect. The impact of early depression was recently reported in one study,²⁶ while another cites the prevalence of depression in poor, nonwhite single mothers and comments on the possible links between maternal depression, insufficient interaction between mother and child, and the development of low self-esteem in nonwhite children.²⁷ These interactions may, in turn, be linked to poor academic achievement, which has previously been associated with young parenthood. In addition, our study found that offspring who themselves reported significant depressive symptoms were more likely to become young parents than those who did not report such symptoms.

The importance of emotional loss in the role of school-age parenthood has been postulated in the past.²⁸ An analysis of the psychiatric referrals from the original YMP concludes that teenagers whose mothers were emotionally unavailable may have borne a child to compensate for feelings of emotional emptiness or unfulfilled yearnings for closeness with their mothers.²⁹ Similarly, a review of the psychiatric aspects of school-age pregnancy concluded that younger pregnant teenagers came from unsatisfactory home backgrounds with considerable emotional loss and parental psychopathology.³⁰ A tendency toward emotional difficulties, and often toward delinquency, in children whose parents exhibit psychiatric

disturbances has been reported often in the literature on vulnerable children.³¹ Data reported here, like those of previous studies, suggest that emotional loss, particularly at a young age, may predispose adolescents to seek emotional closeness through sexual activity and early parenthood.

A final predictor of young parenthood, being female, has also been considered in previous work. The National Institute of Mental Health's Epidemiologic Catchment Area study,³² and the Denise Kandel and Mark Davies work on Adolescent Depressive Mood,³³ indicate that females and males exhibit psychopathology differently: Men tend to drink excessively and commit anti-social acts; females tend to become depressed. In our data, males were more likely than females to commit delinquent acts.

Although sex-specific ways of exhibiting psychopathology are one explanation for higher levels of early parenthood among females than among males, there is a second possible reason for this finding: While women always know if they are mothers and usually know if they are to become

mothers, young men may not always know that they are to be fathers. Systematic under-reporting of teenage fatherhood may have occurred because young men with multiple partners may not know, or may not acknowledge, that they have fathered a child. If such bias has been introduced in our data, particularly because we chose to include as young parents only those male offspring we were certain fathered a child at age 18 or younger, then being female would not remain a predictor of school-age parenthood.

We found that many females who became young parents, engaged in delinquent activities and were high school dropouts, but we found no evidence in our data that these problem behaviors predated either the pregnancy or the birth, nor did we find that early school failure was related to early parenthood. Furthermore, we found no evidence that early parenthood was a means to establishing adult status for young women who came from the most disadvantaged families—the "alternate lifestyle" explanation. In our cohort, mother's marital status, family income and mother's education were all unrelated

Table 3. Logistic regression model for variables related to school-age parenthood in all offspring

Variable	Regression coefficient	Standard error	X ²	Odds ratio	95% confidence interval
Mother lived alone at 26 months postpartum	1.49	0.88	2.88	3.14	0.91, 12.20
Mother showed depressive symptoms	1.17	0.87	1.81	3.00	0.80, 11.31
Offspring is female	1.44	0.68	4.49	2.79	1.00, 7.76
Offspring showed depressive symptoms	1.40	0.65	4.66	2.62	0.93, 7.39
Intercept	-3.33	0.69	23.09	na	na

to young parenthood in the bivariate analyses. In addition, the relationship of a variable that combined mother's education and economic independence to young parenthood was explained by maternal depression.

Like many studies, this project has limitations. While we interviewed virtually all of the children we had permission to contact and could locate, they represented only 75 percent of the first children born to the cohort of former young mothers. Although we have no reason to suspect that the former young mothers we interviewed differed substantially from the remainder of the cohort, there is always the possibility that they did and that this difference explains our results.

There is also a second, more subtle, form of sample selectivity. All of these adolescents were children of former school-age mothers who, during their pregnancies, received a comprehensive set of services designed to ameliorate the consequences of school-age pregnancy and parenthood. Given evidence that this program had a positive effect on the lives of the participants, it may have indirectly affected these adolescents.³⁴ If so, we would expect these adolescents to contrast sharply with adolescents born to young mothers who had not participated in such programs. Our adolescents share many of the same characteristics as those in the cohorts of both Furstenberg and colleagues and the NLSY.³⁵ While the offspring in the Furstenberg cohort received some form of intervention, the NLSY cohort, a national sample, may or may not have included mothers who received any kind of intervention. The similarities across these groups of youth do not indicate bias resulting from a second-generation program effect. However, we cannot precisely quantify the impact of the YMP program on these adolescents.

Another limitation is our small sample size, which restricts our ability to find statistically significant predictors of school-age parenthood. To compensate for this lack of statistical power, we relaxed the standards of statistical significance and paid more attention to predictors with risk ratios or odds ratios of two or greater. However, we may have been unable to find additional important predictors of school-age parenthood because of the small sample size.

A final limitation of this study is that the symptoms of depression in mothers and their offspring were retrospective and self-reported. Adolescents may have reported such symptoms to justify their behavior. However, the vast majority of adolescents reported having initial depressive symptoms early (ages 10 to 12) and more than one year before beginning sexual relations. Reports by the

original young mothers of the onset of major depressive symptoms prior to the index pregnancy were confirmed within program records. We have no reason to suspect that the offspring born to these former adolescent mothers should respond less accurately than their mothers, and given that the time interval they are asked to recall is much shorter, we expect that they may even be somewhat more accurate in identifying the age of onset of their symptoms.

This study has important implications for interventions designed to reduce the occurrence of school-age pregnancy. Adolescents born to school-age mothers with a history of depression, or those who may have experienced the loss of a caretaker early in their lives and are themselves depressed, should be targeted for early intervention. These adolescents are much more likely to become young parents than those adolescents who do not have these risk factors.

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Special Report

An Ounce of Prevention . . . STDs and Women's Health

By Frances A. Althaus

Throughout the first half of the 20th century, public health concerns about sexually transmitted diseases (STDs) centered on syphilis and gonorrhea. At the close of World War II, penicillin was found to be an effective treatment for both of these STDs, and the incidence of new infections began to fall. By the mid-1950s, it appeared that these once-dreaded diseases had been vanquished by modern medicine, and the public health mechanisms that had been established to combat them were cut back. By the 1970s, however, penicillin-resistant strains of gonorrhea were emerging, and the incidence of syphilis was rising rapidly among some population groups.

Still more alarming was the increasing incidence of many lesser-known STDs, some of which were caused by viruses and therefore could not be cured. Nevertheless, most people, subscribing to the long-standing belief that STDs affected only certain groups (such as prostitutes), did not consider themselves at risk of infection.

The advent of the AIDS epidemic in the 1980s raised the level of public awareness about STDs, but the consequences and costs of sexually transmitted infections still are not generally recognized. There is a widespread perception that, with the exception of AIDS, STDs do not cause serious health problems, and that widespread screening and treatment are not cost-effective. In fact, quite the opposite is true. Infection with STDs can result in severe health problems. STDs also cause substantial mortality, yet such deaths are usually not perceived as STD related, in part because they are indirect or delayed effects. Furthermore, the lesions caused by some STDs, such as syphilis, chancroid and herpes, increase the risk that exposure to the human immunodeficiency virus (HIV) will result in infection. And although prevention, screening and treatment are costly, consid-

erable data demonstrate that the expenses incurred by the consequences of untreated STDs are much greater.

As a result of the STD epidemic, family planning clinics across the United States are seeing increasing numbers of infected clients. With budgets already stretched thin by cutbacks in Title X funding, these clinics are being overwhelmed by the time and the costs involved in diagnosing and treating STDs and their consequences. At some clinics, patients with STDs are now the rule rather than the exception.

According to Vicki Alexander, medical director of a New York City family planning agency that serves low-income women, conditions in "areas served by her agency" are like those of "Third World country."¹ Alexander says, for example, that the rate of syphilis infection is 1.6–3 percent at the organization's 12 community clinics, and 24 percent among the homeless women served by its mobile clinic. Yet massive reductions in public funding have forced service cuts and the closing of clinics serving the working poor (many of whom have no health insurance) and the homeless, who already have few health care options.²

Although the burdens of these infections and their consequences fall most heavily on minorities and on the poor, sexually transmitted infections are widespread in the United States.³ In 1989, according to estimates from the Centers for Disease Control (CDC), 13 million persons in the United States were newly infected with one or more symptomatic sexually transmitted diseases.⁴ This figure represents only the tip of the iceberg, because sexually transmitted infections do not always cause noticeable symptoms. For example, 50–70 percent of chlamydial infections in women are asymptomatic.⁵ Moreover, incidence data are limited: Only a few STDs are classified as notifiable diseases in all states.*

Even in the case of notifiable STDs, the actual number of new infections may be much

higher than the reported total. For example, more than 670,000 new cases of gonorrhea were reported in 1990, but public health officials estimate that reported cases represent only half of the disease's actual incidence.⁶ Gonorrhea, once the most common STD, has now been eclipsed by chlamydia (not a notifiable disease in most states), which causes an estimated four million new infections annually.⁷ Syphilis has reached its highest level of incidence since 1950, with more than 48,000 new cases reported in 1990.⁸

As of May 31, 1991, a total of 179,136 cases of AIDS had been reported in the United States, with 43,339 cases reported in 1990 alone.⁹ In addition, the CDC estimates that each year, 200,000–500,000 people contract genital herpes and from 500,000 to one million become infected with human papillomavirus (HPV).¹⁰

STD infections have particularly important implications for women. During heterosexual intercourse, STDs are more easily transmitted to women than to men by an infected partner;¹¹ moreover, infections in women are less likely to be symptomatic, are more difficult to diagnose and are more likely to cause serious, long-term consequences.¹² If untreated, reproductive tract infections may lead to pelvic inflammatory disease (PID), ectopic pregnancy, infertility, adverse pregnancy outcomes, and maternal and infant illness and death.

Mortality

Most deaths that are attributable to STDs are caused by incurable viral infections. This year, AIDS is expected to become one of the five leading causes of death among women aged 15–44;¹³ as of March 31, 1991, women accounted for 18,181 cases, or 10.6 percent of all reported cases of AIDS.¹⁴ The rate of AIDS-

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*In most states, only cases of the five "traditional" STDs—chancroid, gonorrhea, syphilis, granuloma inguinale and lymphogranuloma venereum—must be reported.

related deaths is disproportionately high among black women: In 1988, the age-adjusted rate among women of reproductive age was almost nine times as high among black women as among white women (10.3 vs. 1.2 per 100,000).¹⁵

Cancers of the reproductive tract have been associated with herpes simplex, human papillomavirus and HIV infections. Current research suggests that genital herpes is not an important etiologic agent in cervical cancer, although it may play a role in some cases.¹⁶

There is considerable evidence that certain strains of HPV are involved in premalignant and malignant genital lesions,¹⁷ although additional studies suggest that cofactors such as genetic predisposition, smoking or infection with other STDs may be necessary to trigger the development of HPV-associated malignancies.¹⁸

Recent reports have suggested that HIV-infected women, particularly those with an HPV coinfection, may be at increased risk of cervical cancer.¹⁹ Cervical cancer also appears to progress much faster in HIV-seropositive women.²⁰

Pelvic Inflammatory Disease

When microorganisms spontaneously ascend from the lower reproductive tract and infect the uterus, fallopian tubes and ovaries, the result is pelvic inflammatory disease,* a poorly defined syndrome that is difficult to diagnose and is often asymptomatic.²¹ Most cases of PID are caused by chlamydia or gonorrhea, but a variety of other bacteria—some of which are endogenous flora of the lower reproductive tract—may also play a role; in many cases, multiple organisms are involved.²²

PID is one of the major causes of impaired fertility in women. One study found that the risk of infertility after PID ranged from 5.8 percent to 60 percent, depending on the severity of the infection, the number of episodes and the age of the woman.²³

It is estimated that 10–15 percent of U.S. women of reproductive age have had at least one episode of PID, and that approximately one million women experience an episode of symptomatic PID each year.²⁴

*Different diagnostic terms are traditionally used for upper reproductive tract infections related to pregnancy or gynecological surgery.

†Up to one-third of women may have recurring episodes of PID. A high rate of recurrence is common even after a first episode of non-STD-associated PID. More than half of second infections occur within a year of the first. (See: L. Westrom and P.-A. Mårdh, "Reproductive Events After Acute Salpingitis," paper presented at NIH/NIAID STD Study Group Meeting, Jan. 14–16, 1990, Washington, D.C.)

This estimate is supported by the results of a national survey conducted in 1988, in which about one in nine women aged 15–44 reported having been treated for PID.²⁵

These figures may underrepresent the actual incidence of PID. A growing body of evidence suggests that large numbers of women may have "silent" upper reproductive tract infections, which may result in extensive damage without causing the lower abdominal pain, fever, or cervical, uterine and adnexal tenderness that are the most common symptoms of PID.²⁶ Silent infection is a major concern, because PID's long-term consequences—chronic pelvic pain, ectopic pregnancy, infertility and recurrent episodes of infection—are most likely to occur in women who do not receive early and adequate treatment. According to the Expert Committee on Pelvic Inflammatory Disease, silent PID probably accounts for a significant proportion of ectopic pregnancies and the majority of cases of tubal infertility.²⁷

The disease is most common among young women: Sexually experienced teenagers are 1.7 times more likely than sexually experienced 25–29-year-olds to be diagnosed with PID.²⁸ Information from national data bases indicates that about 210,000 women—43 percent of whom were younger than 25—were hospitalized for PID in 1988; about one-third of those women underwent surgical procedures, including more than 29,000 hysterectomies.²⁹ Because many women are postponing childbearing until their 30s, these figures are grounds for concern.

Ectopic Pregnancy

The immediate causes of ectopic pregnancy are unknown, but it has been estimated that up to 50 percent of ectopic pregnancies may be the result of previous PID.³⁰ Women who have had PID have a sevenfold to tenfold increased risk of ectopic pregnancy.³¹ Among women who have had one ectopic pregnancy, 10–20 percent will have another,³² and 20–40 percent will be unable to conceive again.³³

In 1987, the number of ectopic pregnancies in the United States reached an all-time high of 88,000.³⁴ Between 1970 and 1987, the number per 1,000 pregnancies among women aged 15–44 more than tripled. Although the rate among white women increased much more than did the rate among minority women during that period, the rate among minority women in 1987 was still 46 percent higher than that for white women (14.2 vs. 9.7 per 1,000 pregnancies).³⁵

Although ectopic pregnancies made up only 1.7 percent of all pregnancies in 1987, they accounted for 12 percent of all maternal mortality. During that year, a total of 30

women—3.4 of every 10,000 women who had an ectopic pregnancy—died as a result. Despite a 90 percent decrease in mortality from ectopic pregnancy since 1970, the risk remained 85 percent higher for black and minority women than for white women, possibly reflecting less access to and use of prenatal care during the first trimester.³⁶

Adverse Pregnancy Outcomes

The effects of syphilis on birth outcome—which vary according to the stage of the mother's disease—have been known for several decades. Untreated early syphilis in a pregnant woman is transmitted to the fetus in the majority of cases: In a study published in 1952, all women with untreated primary or secondary syphilis delivered a premature, syphilitic or stillborn infant, although only half of the infants were manifestly syphilitic.³⁷ The effects of gonorrhea on birth outcomes are less clear.³⁸ Some studies have linked the disease to septic abortion, to premature or prolonged rupture of the membranes and to prematurity, but small sample sizes limit the conclusions that can be drawn from these data.³⁹

More recent research has suggested that other bacterial or parasitic infections—particularly chlamydia—may also be involved in poor pregnancy outcomes.⁴⁰ Supporting evidence has been provided by studies of the effects of antibiotic therapy during pregnancy.⁴¹ In one study, a group of women treated with tetracycline had significantly longer gestations, fewer infants born weighing less than 2,500 g, fewer episodes of postpartum fever and fewer neonatal complications than the placebo-treated group.⁴² In another study, women successfully treated for chlamydia were significantly less likely than those whose treatment was not successful to have premature rupture of the membranes, premature contractions or premature delivery, or to bear an infant that was small for gestational age.⁴³ However, the literature does not present a consistent picture of the effects of many infections on pregnancy outcome, and it is difficult to compare study results because of differences in samples, methodology and possible confounding factors.

Reproductive tract infections may affect pregnancy outcome through inflammation of the fetal membranes (chorioamnionitis), which has been associated with low birth weight, prolonged rupture of the membranes, intrapartum fever, and perinatal sepsis and death.⁴⁴ A 1979 study found evidence of chorioamnionitis in 40–54 percent of spontaneous abortions occurring in the second trimester.⁴⁵ (Spontaneous abortion in the first trimester is usually associated with

fetal abnormalities.) Chorioamnionitis is most common among nonwhite women of low socioeconomic status who have not received prenatal care, the same population that is at highest risk of STDs.⁴⁶ Moreover, the range of organisms cultured from the amniotic fluid of women with chorioamnionitis includes many of the organisms found in women with lower genital tract bacterial infections.

Viral infections may also affect the outcome of pregnancy. For instance, spontaneous abortion may occur if a pregnant woman becomes infected with genital herpes before 20 weeks of gestation.⁴⁷ Moreover, a 1989 nationwide study found that among infants born with herpes infection, 41 percent were born prematurely, and the same proportion were of low birth weight.⁴⁸ Cytomegalovirus has been associated with prematurity and intrauterine growth retardation.⁴⁹

Neonatal Health Problems

In addition to causing problems during pregnancy and delivery, the organisms that cause reproductive tract infections may be transmitted to the developing fetus or to the infant at the time of birth. These infections can cause serious health problems, some of which may persist into adulthood.⁵⁰ Gonorrhea can infect the eyes and other mucous membranes, or result in systemic disease such as meningitis and septic arthritis.⁵¹ Up to 70 percent of infants born to women with cervical chlamydia infections may become infected; their risk of eye infections is 20–50 percent and their risk of pneumonia is 11–20 percent.⁵² There is also some evidence that chlamydial pneumonia during infancy may be linked to chronic respiratory disease during childhood,⁵³ but the data are not conclusive.

There were 685 cases of early congenital syphilis reported in the United States in 1990.⁵⁴ Clinical manifestations of the disease are usually absent at the time of delivery, but begin to appear in three to eight weeks after birth; obviously syphilitic neonates are generally severely affected and have a very poor prognosis.⁵⁵ Fortunately, almost all except the most severely infected infants can be cured if they are diagnosed early and given appropriate treatment.⁵⁶

About one-third of infants born to HIV-infected women will themselves show evidence of infection within a year after birth, and about 20 percent of these will die by the age of 18 months.⁵⁷ The disease progresses much more rapidly in infants than in adults; in one study, almost 60 percent of the HIV-positive infants were severely ill by the age of 18 months.⁵⁸

Transmission of herpes simplex infection

from mother to infant is most likely to occur if the mother's initial infection is recent: One study reported a transmission risk of 50 percent among infants delivered vaginally when the mother's primary episode was diagnosed at more than 32 weeks of gestation, compared with a risk of four percent during recurrent episodes diagnosed at the same stage of pregnancy.⁵⁹ However, most infected infants are born to asymptomatic women: In one study, 70 percent of the mothers with infected infants had no signs of herpes infection at the time of delivery.⁶⁰

Morbidity and mortality from neonatal herpes infection vary according to the manifestation of the disease. One study reported mortality of 57 percent among infants with disseminated herpes infection, compared with 15 percent among infants with encephalitis and no deaths among infants with local infections.⁶¹ At age one, 94 percent of infants who had had local infections were free of neurologic impairments and were developing normally, compared with 36 percent of those who had survived encephalitis and 59 percent of those who had survived disseminated disease.

Mother-to-infant transmission of group B streptococcus, one of the lesser known STDs, occurs at a rate of about 65–72 percent.⁶² However, actual disease appears in a very small proportion of infants (about 2.4 cases per 1,000 births).⁶³ Mortality from the early-onset form of the disease, which is characterized by respiratory distress and infection of the bloodstream, is 30–50 percent. Late-onset disease, which is generally not thought to be the result of vertical transmission, is characterized by meningitis and has a lower mortality rate than early-onset disease.⁶⁴ It has been estimated that about 7,500 early-onset cases and 2,400 late-onset cases occur in the United States each year.⁶⁵

The High Cost of STDs

The financial impact of STDs is substantial. For example, the total estimated cost of PID and its consequences (including ectopic pregnancy and infertility) in 1990 was more than \$4.2 billion.⁶⁶ Of that amount, direct expenditures for medical care accounted for about \$2.7 billion, and indirect costs (lost wages and the lost value of household management) accounted for about \$1.5 billion.⁶⁷ Public programs paid about one-third of PID-related medical costs, amounting to \$900 million.⁶⁸

In comparison, the costs of diagnosis and treatment appear low. One family planning clinic estimated the average total cost of routine screening and treatment for gonorrhea and chlamydia at about \$66 per case found.⁶⁹ In addition, a cost analysis of

statewide screening for chlamydia in family planning clinics in California found that a net savings of \$6 million would be realized in the first year, with annual savings increasing thereafter to about \$13 million.⁷⁰ The analysts also concluded that universal screening of clinic clients would pay for itself in populations with an infection prevalence of two percent or higher.⁷¹

When a woman becomes infected with an STD either before or during pregnancy, the survival or health of the developing fetus may be at risk. Low birth weight has been associated with several STDs, including chlamydia. Low-birth-weight infants are much less likely to survive than their normal-weight counterparts,⁷² and are more likely to have health problems throughout childhood.⁷³ The cost of care for these infants is high: An analysis using 1985 data from 28 perinatal centers that provided tertiary care found that the cost of inpatient hospital care among neonates who went home averaged \$9,072 for those weighing less than 2,500 g, compared with \$678 for those weighing more than 2,500 g.⁷⁴ This analysis found that if 20 percent of the infants in each birth-weight category were shifted to the next higher birth-weight category, \$73–\$96 million in short-term savings would be realized.⁷⁵ Thus, adequate prenatal care, including screening for and treatment of reproductive tract infections, could result in large savings.

Conclusion

As the data presented in this report demonstrate, STDs cause widespread health problems in the United States. These infections not only cause physical discomfort and social stigma, but can endanger women's lives and health. The role of infections in adverse pregnancy outcomes and neonatal health is still unclear, largely because of the ethical and methodological difficulties involved in research in this area. Nevertheless, the available evidence indicates that at least a few STDs have harmful effects on the developing fetus and the neonate.

As the examples of PID and neonatal intensive care show, the costs associated with STDs and their consequences are far from negligible. The increasing need for treatment of STDs and their sequelae is adding to the stresses on a health care system already under pressure to provide more care at lower cost.

Family planning clinics are a case in point. Faced simultaneously with sharp cuts in federal and local funding and an epidemic of sexually transmitted infections, clinics providing subsidized services are hard pressed to provide the care needed by a

high-risk population with few health care alternatives. Failure to provide adequate funding both for family planning and for STD screening and treatment for these women is likely to cause increases in unintended pregnancies and STD-related health problems, with concomitant increases in the cost of health services related to those conditions.

The success of public health campaigns in combating the spread of syphilis and gonorrhea in the first half of the 20th century shows that such efforts can be effective. However, the incidence of STDs can rise very quickly when surveillance and control mechanisms are cut back. Given the rapid spread of HIV and other STDs, a concerted effort to diagnose and treat existing infections and prevent new ones is a cost-effective public health strategy.

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Documents

Court Upholds Title X Ban on Abortion Information

In a 5-4 decision handed down May 23, 1991, the U.S. Supreme Court upheld regulations that prohibit family planning clinics supported by Title X funds from providing any information about abortion—even neutral information and even when the information is specifically requested—while requiring the clinics to refer all pregnant women for prenatal care. The regulations, which were promulgated in 1988 by the Reagan administration, also require agencies that elect to use private funds for abortion-related services to keep those services physically and financially separate from their Title X program.

The Court held, in *Rust v. Sullivan*,¹ that the regulations were not inconsistent with the Title X statute, which prohibits the use of federal funds "in programs where abortion is a method of family planning," and did not violate free speech and privacy rights guaranteed by the First and Fifth Amendments. Since 1981, government policy had required Title X-supported clinics to provide "nondirective counseling" about all legal options to women faced with an unintended pregnancy. Nevertheless, the Court held that the position of the Department of Health and Human Services (DHHS) that Congress intended to prohibit the use of Title X funds for abortion counseling and referral, as well as for the actual performance of abortions, was a "plausible" interpretation of the law and should be given deference in the absence of expressed congressional intent to the contrary.

Similarly, the Court held that the requirement that abortion services be completely separate from Title X-funded services—regarding staff, facilities and record keeping—was a "permissible construction of the statute."

The Court rejected the argument that the regulations are in violation of the First Amendment because they discriminate on the basis of viewpoint by prohibiting all discussion about one option—abortion—for dealing with an unplanned pregnancy while mandating information that promotes another option—

childbirth. The government may "selectively fund a program to encourage certain activities it believes to be in the public interest without at the same time funding an alternate program which seeks to deal with the problem in another way," the Court said.

The Court also denied that the regulations force Title X recipients and their employees to give up their constitutional right to engage in abortion advocacy and counseling in exchange for a government benefit, reasoning that Title X grantees and their staff are free to participate in such activities outside of the Title X clinics. Nor do the regulations "significantly impinge" on the doctor-patient relationship, the Court said, because the doctor is not required "to represent as his own any opinion that he does not in fact hold."

The Court was also unpersuaded by the argument that the regulations violate a woman's Fifth Amendment right to decide whether to terminate her pregnancy, stating: "The government has no constitutional duty to subsidize an activity merely because [it] is constitutionally protected."

The challenge to the regulations was brought to the Supreme Court by the City and State of New York and Planned Parenthood of New York City in an appeal of a federal appeals court decision upholding the regulations on statutory and constitutional grounds. Chief Justice William Rehnquist wrote the opinion of the Court. He was joined by Justices Byron White, Antonin Scalia, Anthony Kennedy and David Souter. Justice Harry Blackmun wrote a dissent in which Justice Thurgood Marshall joined, and in which Justices John Paul Stevens and Sandra Day O'Connor joined in part. Stevens and O'Connor also wrote their own dissenting opinions.

Written excerpts of the majority and dissenting opinions are reprinted below.

The Majority Opinion

... In 1970, Congress enacted Title X of the Public Health Service Act (Act) ... which provides federal funding for family planning

services. The Act authorizes the Secretary [of the Department of Health and Human Services] to "make grants to and enter into contracts with public and nonprofit private entities to assist in the establishment and operation of voluntary family planning projects which shall offer a broad range of acceptable and effective family planning methods and services." ... Section 1008 of the Act ... however, provides, that "[n]one of the funds appropriated under this subchapter shall be used in programs where abortion is a method of family planning." ... That restriction was intended to ensure that Title X funds would "be used only to support preventive family planning services, population research, infertility services and other related medical, informational and educational activities." ...

In 1988, the Secretary promulgated new regulations designed to provide "clear and operational guidance" to grantees about how to preserve the distinction between Title X programs and abortion as a method of family planning. ... The regulations clarify, through the definition of the term "family planning," that Congress intended Title X funds "to be used only to support preventive family planning services." ... Accordingly, Title X services are limited to "preconceptional counseling, education and general reproductive health care," and expressly exclude "pregnancy care (including obstetric or prenatal care)." ...

The regulations attach three principal conditions on the grant of federal funds for Title X projects. First, the regulations specify that a "Title X project may not provide counseling concerning the use of abortion as a method of family planning or provide referral for abortion as a method of family planning." ... Because Title X is limited to preconceptional services, the program does not furnish services related to childbirth. Only in the context of a referral out of the Title X program is a pregnant woman given transitional information. ... Title X projects

must refer every pregnant client "for appropriate prenatal and/or social services by furnishing a list of available providers that promote the welfare of the mother and the unborn child." . . . The Title X project is expressly prohibited from referring a pregnant woman to an abortion provider, even upon specific request. One permissible response to such an inquiry is that "the project does not consider abortion an appropriate method of family planning and therefore does not counsel or refer for abortion." . . .

Second, the regulations broadly prohibit a Title X project from engaging in activities that "encourage, promote or advocate abortion as a method of family planning." . . . Forbidden activities include lobbying for legislation that would increase the availability of abortion . . . developing or disseminating materials advocating abortion . . . providing speakers to promote abortion . . . using legal action to make abortion available in any way . . . and paying dues to any group that advocates abortion as a method of family planning as a substantial part of its activities. . . .

Third, the regulations require that Title X projects be organized so that they are "physically and financially separate" from prohibited abortion activities . . . To be deemed physically and financially separate, "a Title X project must have an objective integrity and independence from prohibited activities. Mere bookkeeping separation of Title X funds from other monies is not sufficient." . . .

. . . We turn first to petitioners' contention that the regulations exceed the Secretary's authority under Title X and are arbitrary and capricious. . . .

. . . We need not dwell on the plain language of the statute because we agree with every court to have addressed the issue that the language is ambiguous. The language of section 1008 . . . does not speak directly to the issues of counseling, referral, advocacy or program integrity. If a statute is "silent or ambiguous with respect to the specific issue, the question for the court is whether the agency's answer is based on a permissible construction of the statute." . . .

The Secretary's construction of Title X may not be disturbed as an abuse of discretion if it reflects a plausible construction of the plain language of the statute and does not otherwise conflict with Congress' expressed intent. . . .

The broad language of Title X plainly allows the Secretary's construction of the statute. By its own terms, section 1008 prohibits the use of Title X funds "in programs where abortion is a method of family plan-

ning." Title X does not define the term "method of family planning," nor does it enumerate what types of medical and counseling services are entitled to Title X funding. Based on the broad directives provided by Congress in Title X in general and section 1008 in particular, we are unable to say that the Secretary's construction of the prohibition in section 1008 to require a ban on counseling, referral and advocacy within the Title X project is impermissible.

. . . We join [lower courts that have considered the issue] in holding that the legislative history [of section 1008] is ambiguous and fails to shed light on relevant congressional intent . . . When we find . . . that the legislative history is ambiguous . . . we customarily defer to the expertise of the agency. Petitioners argue, however, that the regulations are entitled to little or no deference because they "reverse a longstanding agency policy that permitted nondirective counseling and referral for abortion . . . and thus represent a sharp break from the Secretary's prior construction of the statute . . . An agency is not required to "establish rules of conduct to last forever," . . . but rather "must be given ample latitude to 'adapt [its] rules and policies to the demands of changing circumstances.'" . . .

. . . We turn next to the "program integrity" requirements . . . mandating separate facilities, personnel and records. These requirements are not inconsistent with the plain language of Title X. Petitioners contend, however, that they are based on an impermissible construction of the statute because they frustrate the clearly expressed intent of Congress that Title X programs be an integral part of a broader, comprehensive, health-care system . . .

The Secretary defends the separation requirements . . . on the grounds that they are necessary to assure that Title X grantees apply federal funds only to federally authorized purposes and that grantees avoid creating the appearance that the government is supporting abortion-related activities. The program integrity regulations were promulgated in direct response to the observations in the GAO [General Accounting Office] and OIG [Office of the Inspector General] reports that "because the distinction between the requirements of Title X and other activities may not be clearly recognized, the public can get the impression that federal funds are being improperly used for abortion activities." . . .

. . . We agree that the program integrity requirements are based on a permissible construction of the statute and are not inconsistent with congressional intent. . . .

. . . Indeed, if one thing is clear from the

legislative history, it is that Congress intended that Title X funds be kept separate and distinct from abortion-related activities. . . .

. . . Petitioners contend that the regulations violate the First Amendment by impermissibly discriminating based on viewpoint because they prohibit "all discussion about abortion as a lawful option—including counseling, referral and the provision of neutral and accurate information about ending a pregnancy—while compelling the clinic or counselor to provide information that promotes continuing a pregnancy to term." . . . They assert that the regulations violate the "free speech rights of private health care organizations that receive Title X funds, of their staff and of their patients" by impermissibly imposing "viewpoint-discriminatory conditions on government subsidies" and thus "penaliz[e] speech funded with non-Title X monies." . . .

There is no question but that the statutory prohibition contained in section 1008 is constitutional. In *Maier v. Roe*,² . . . we upheld a state welfare regulation under which Medicaid recipients received payments for services related to childbirth, but not for nontherapeutic abortions. The Court rejected the claim that this unequal subsidization worked in violation of the Constitution. We held that the government may "make a value judgment favoring childbirth over abortion, and . . . implement that judgment by the allocation of public funds." . . . Here the government is exercising the authority it possess under *Maier* and [*Harris v.*] *McRae*³ to subsidize family planning services which will lead to conception and childbirth, and declining to "promote or encourage abortion." The government can, without violating the Constitution, selectively fund a program to encourage certain activities it believes to be in the public interest, without at the same time funding an alternate program which seeks to deal with the problem in another way. In so doing, the government has not discriminated on the basis of viewpoint; it has merely chosen to fund one activity to the exclusion of the other. . . .

. . . To hold that the government unconstitutionally discriminates on the basis of viewpoint when it chooses to fund a program dedicated to advance certain permissible goals, because the program in advancing those goals necessarily discourages alternate goals, would render numerous government programs constitutionally suspect. When Congress established a National Endowment for Democracy to encourage other countries to adopt democratic principles . . . it was not constitutionally required to fund a program to encourage competing lines of political philosophy such as Communism and

Fascism. Petitioners' assertions ultimately boil down to the position that if the government chooses to subsidize one protected right, it must subsidize analogous counterpart rights. But the Court has soundly rejected that proposition... Within far broader limits than petitioners are willing to concede, when the government appropriates public funds to establish a program it is entitled to define the limits of that program.

... Petitioners rely heavily on their claim that the regulations would not, in the circumstances of a medical emergency, permit a Title X project to refer a woman whose pregnancy places her life in imminent peril to a provider of abortions or abortion-related services. ... On their face, we do not read the regulations to bar abortion referral or counseling in such circumstances. ...

... Petitioners also contend that the restrictions on the subsidization of abortion-related speech contained in the regulations are impermissible because they condition the receipt of a benefit, in this case Title X funding, on the relinquishment of a constitutional right, the right to engage in abortion advocacy and counseling. ...

... [T]he government is not denying a benefit to anyone, but is instead simply insisting that public funds be spent for the purposes for which they were authorized. The ... regulations do not force the Title X grantee to give up abortion-related speech; they merely require that the grantee keep such activities separate and distinct from Title X activities. Title X expressly distinguishes between a Title X grantee and a Title X project. The grantee, which normally is a health care organization, may receive funds from a variety of sources for a variety of purposes ... The grantee receives Title X funds, however, for the specific and limited purpose of establishing and operating a Title X project ... The regulations govern the scope of the Title X project's activities, and leave the grantee unfettered in its other activities. The Title X grantee can continue to perform abortions, provide abortion-related services and engage in abortion advocacy; it simply is required to conduct those activities through programs that are separate and independent from the project that receives Title X funds. ...

... The same principles apply to petitioners' claim that the regulations abridge the free speech rights of the grantee's staff. Individuals who are voluntarily employed for a Title X project must perform their duties in accordance with the regulation's restrictions on abortion counseling and referral. The employees remain free, however, to pursue abortion-related activities when they are not acting under the auspices of the Title

X project. The regulations ... do not in any way restrict the activities of those persons acting as private individuals. The employees' freedom of expression is limited during the time that they actually work for the project; but this limitation is a consequence of their decision to accept employment in a project, the scope of which is permissibly restricted by the funding authority.

... [T]he Title X program regulations do not significantly impinge upon the doctor-patient relationship. Nothing in them requires a doctor to represent as his own any opinion that he does not in fact hold. [Because t]he program does not provide postconception medical care, ... a doctor's silence with regard to abortion cannot reasonably be thought to mislead a client into thinking that the doctor does not consider abortion an appropriate option for her. The doctor is always free to make clear that advice regarding abortion is simply beyond the scope of the program. ...

... We turn now to petitioners' argument that the regulations violate a woman's Fifth Amendment right to choose whether to terminate her pregnancy. ... The government has no constitutional duty to subsidize an activity merely because the activity is constitutionally protected and may validly choose to fund childbirth over abortion and "implement that judgment by the allocation of public funds" for medical services relating to childbirth but not to those relating to abortion. ...

... That the regulations do not impermissibly burden a woman's Fifth Amendment rights is evident from the line of cases beginning with *Maher and McRae* and culminating in our most recent decision in *Webster v. Reproductive Health Services*.⁴ ... Congress' refusal to fund abortion counseling and advocacy leaves a pregnant woman with the same choices as if the government had chosen not to fund family planning services at all. The difficulty that a woman encounters when a Title X project does not provide abortion counseling or referral leaves her in no different position than she would have been if the government had not enacted Title X.

In *Webster* we stated that "[h]aving held that the state's refusal ... to fund abortion does not violate *Roe v. Wade*,⁵ it strains logic to reach a contrary result for the use of public facilities and employees." ... It similarly would strain logic, in light of the more extreme restrictions in those cases, to find that the mere decision to exclude abortion-related services from a federally funded pre-conceptual family planning program is unconstitutional.

Petitioners also argue that by impermis-

sibly infringing on the doctor/patient relationship and depriving a Title X client of information concerning abortion ... the regulations violate a woman's ... right to medical self-determination and to make informed medical decisions free of government-imposed harm. They argue that under our decisions in *Akron v. Akron Center for Reproductive Health, Inc.*⁶ ... and *Thornburgh v. American College of Obstetricians and Gynecologists*,⁷ ... the government cannot interfere with a woman's right to make an informed and voluntary choice by placing restrictions on the patient/doctor dialogue.

In *Akron*, we invalidated a city ordinance requiring all physicians to make specified statements to the patient prior to performing an abortion. ... Similarly, in *Thornburgh*, we struck down a state statute mandating that a list of agencies offering alternatives to abortion and a description of fetal development be provided to every woman considering terminating her pregnancy. ... Critical to our decisions ... to invalidate a governmental intrusion into the patient/doctor dialogue was the fact that the laws in both cases required all doctors within their respective jurisdictions to provide all pregnant patients contemplating an abortion a litany of information. ... Under the ... regulations, however, a doctor's ability to provide, and a woman's right to receive, information concerning abortion and abortion-related services outside the context of the Title X project remains unfettered. It would undoubtedly be easier for a woman seeking an abortion if she could receive information about abortion from a Title X project, but the Constitution does not require that the government distort the scope of its mandated program in order to provide that information.

Blackmun's Dissent

Casting aside established principles of statutory construction and administrative jurisprudence, the majority in these cases today unnecessarily passes upon important questions of constitutional law. In so doing, the Court, for the first time, upholds viewpoint-based suppression of speech solely because it is imposed on those dependent upon the government for economic support. Under essentially the same rationale, the majority upholds direct regulation of dialogue between a pregnant woman and her physician when that regulation has both the purpose and the effect of manipulating her decision as to the continuance of her pregnancy. I conclude that the Secretary's regulation of referral, advocacy and counseling activities exceeds his statutory authority, and, also, that the regulations violate the First and Fifth Amendments. ...

... Until today, the Court never has upheld viewpoint-based suppression of speech simply because that suppression was a condition upon the acceptance of public funds. Whatever may be the government's power to condition the receipt of its largess upon the relinquishment of constitutional rights, it surely does not extend to a condition that suppresses the recipient's cherished freedom of speech based solely upon the content or viewpoint of that speech. ...

... It cannot seriously be disputed that the counseling and referral provisions at issue in the present cases constitute content-based regulation of speech. Title X grantees may provide counseling and referral regarding any of a wide range of family planning topics, save abortion. ...

The regulations are also clearly viewpoint-based. While suppressing speech favorable to abortion with one hand, the Secretary compels antiabortion speech with the other. ... [T]he regulations command that a project refer for prenatal care each woman diagnosed as pregnant, irrespective of the woman's expressed desire to continue or terminate her pregnancy. ... If a client asks directly about abortion, a Title X physician or counselor is required to say, in essence, that the project does not consider abortion to be an appropriate method of family planning. ... Both requirements are antithetical to the First Amendment. ...

... The Court concludes that the challenged regulations do not violate the First Amendment rights of Title X staff members because any limitation of the employees' freedom of expression is simply a consequence of their decision to accept employment at a federally funded project. ... But it has never been sufficient to justify an otherwise unconstitutional condition upon public employment that the employee may escape the condition by relinquishing his or her job. ...

... The majority [emphasizes] that Title X physicians and counselors "remain free ... to pursue abortion-related activities when they are not acting under the auspices of the Title X project." ... Under the majority's reasoning, the First Amendment could be read to tolerate any government restriction upon an employee's speech so long as that restriction is limited to the funded workplace. This is a dangerous proposition, and one the Court has rightly rejected in the past.

... By far the most disturbing aspect of today's ruling is the effect it will have on the Fifth Amendment rights of the women who, supposedly, are the beneficiaries of Title X programs. ...

Until today, the Court has allowed to stand only those restrictions upon repro-

ductive freedom that, while limiting the availability of abortion, have left intact a woman's ability to decide without coercion whether she will continue her pregnancy to term. ... Today's decision abandons that principle, and with disastrous results.

Contrary to the majority's characterization, this is not a case in which individuals seek government aid in exercising their fundamental rights. The Fifth Amendment right asserted by petitioners is the right of a pregnant woman to be free from affirmative governmental interference in her decision. *Roe v. Wade* ... and its progeny are not so much about a medical procedure as they are about a woman's fundamental right to self-determination. ...

... By suppressing medically pertinent information and injecting a restrictive ideological message unrelated to consideration of maternal health, the government places formidable obstacles in the path of Title X clients' freedom of choice and thereby violates their Fifth Amendment rights.

... Both the purpose and the result of the challenged regulations is to deny women the ability voluntarily to decide their procreative destiny. For these women, the government will have obliterated the freedom to choose as surely as if it had banned abortions outright. The denial of this freedom is not a consequence of poverty but of the government's ill-intentioned distortion of information it has chosen to provide.

... In its haste further to restrict the right of every woman to control her reproductive freedom and bodily integrity, the majority disregards established principles of law and contorts this Court's decided cases to arrive at its preordained result. The majority professes to leave undisturbed the free speech protections upon which our society has come to rely, but one must wonder what force the First Amendment retains if it is read to countenance the deliberate manipulation by the government of the dialogue between a woman and her physician. While technically leaving intact the fundamental right protected by *Roe v. Wade*, the Court ... once again has rendered the right's substance nugatory. ... This is a course nearly as noxious as overruling *Roe* directly, for if a right is found to be unenforceable, even against flagrant attempts by government to circumvent it, then it ceases to be a right at all. This, I fear, may be the effect of today's decision.

O'Connor's Dissent

... This Court acts at the limits of its power when it invalidates a law on constitutional grounds. ... In this case, we need only tell

the Secretary that his regulations are not a reasonable interpretation of the statute; we need not tell Congress that it cannot pass such legislation. If we rule solely on statutory grounds, Congress retains the power to force the constitutional question by legislating more explicitly. It may instead choose to do nothing. That decision should be left to Congress. ... It is enough in this case to conclude that neither the language nor the history of section 1008 compels the Secretary's interpretation, and that the interpretation raises serious First Amendment concerns. On this basis alone, I would reverse the judgment of the Court of Appeals and invalidate the challenged regulations.

Stevens's Dissent

In my opinion, the Court has not paid sufficient attention to the language of the controlling statute or to the consistent interpretation accorded the statute by the responsible cabinet officers during four different Presidencies and 18 years.

... Read in the context of the entire statute, [the] prohibition [in section 1008] is plainly directed at conduct, rather than the dissemination of information or advice. ...

... I am convinced that the 1970 Act did not authorize the Secretary ... to censor the speech of grant recipients or their employees. ...

References

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2. *Maher v. Roe*, 432 U.S. 464 (1977).
3. *Harris v. MacRae*, 448 U.S. 297 (1980).
4. *Webster v. Reproductive Health Services*, 492 U.S. 490 (1989).
5. *Roe v. Wade*, 410 U.S. 113 (1973).
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A Tribute

Harriet Fleischl Pilpel

By Sylvia A. Law

The spring of 1991 was a season of profound loss for reproductive choice and free expression. On April 23, Harriet Fleischl Pilpel died in her sleep. One month later, on May 23, the U.S. Supreme Court upheld regulations prohibiting doctors in federally funded family planning clinics from mentioning abortion to women who have an unwanted pregnancy.

For five decades, Harriet Pilpel was a pre-eminent strategist, advocate and organizer for reproductive freedom and free speech. At the time of her death, she was general counsel to the Planned Parenthood Federation of America (PPFA) and special counsel to Planned Parenthood of New York City, and was active on the boards of many organizations, including The Alan Guttmacher Institute and the National Abortion Rights Action League. She had served ably in leadership positions in the American Civil Liberties Union (ACLU) since 1962.

When Harriet was still in high school, she determined the two values that were central to her identity: the power to decide for herself whether and when to have children, and the freedom to speak her mind. Her deep compassion and empathy for others fueled a lifetime of work to extend these liberties to every person in the world.

Harriet received a bachelor's degree from Vassar College in 1932, and both a master's and a law degree from Columbia University. She remained active with both of these academic institutions throughout her life, ever loyal and sometimes critical. Her schools honored her in turn: as the articles editor of the *Columbia Law Review*, as winner (in 1980) of the Columbia Law School Alumni Association Award for Excellence, and as the Vassar President's Distinguished Visitor in 1985.

As a lawyer, Harriet was brilliant and eclectic. From 1936 to 1982, most of her legal

career, she practiced with Greenbaum, Wolff and Ernst, a firm specializing in First Amendment issues. When the firm disbanded, she became counsel to Weil, Gotschal and Manges. Her practice included family law and copyright, as well as First Amendment and reproductive freedom issues. She nurtured generations of authors who were privileged to be her clients, and she taught legions of young lawyers.

Between 1937 and 1991, Harriet participated in 27 cases before the U.S. Supreme Court. In her early cases, she helped to win important victories for free speech. In *Hahnegan v. Esquire, Inc.* (327 U.S. 146, 1946), the Court declared that "grave constitutional questions are immediately raised once it is said that the use of the mails is a privilege which may be extended or withheld [by Congress or the Post Office] on any grounds whatsoever." Throughout her career, Harriet litigated and wrote perceptively on matters of free expression, family law and copyright.

The Supreme Court rejected Harriet's first effort to establish a constitutional right of reproductive freedom, when she served as lead counsel on behalf of PPFA in *Poe v. Ullman* (367 U.S. 497, 1961). In that case, the Court refused to hear a challenge to Connecticut's unenforced ban on birth control. However, the dissenting justices, relying in part on an article that Harriet had published in the *North Carolina Law Review*, urged the Court to hear the case and recognize a fundamental right to privacy. As Justice John M. Harlan asserted: "The full scope of the liberty guaranteed by the Due Process Clause cannot be found in or limited by the precise terms of the specific guarantees elsewhere provided in the Constitution. This 'liberty' is not a series of isolated points picked out in [specific] terms It is a rational continuum which, broadly speaking, includes a freedom from all substantial arbitrary impositions and purposeless restraining . . . and which also recognizes . . . that certain inter-

ests require particularly careful scrutiny of the state needs asserted to justify their abridgement."

Harriet and her colleagues continued to press for constitutional recognition of reproductive choice. Four years later, in *Griswold v. Connecticut* (381 U.S. 479, 1965), the Court adopted the view that the dissenters had urged in *Poe*. Over the next decade, Harriet played a leading role in crafting the claims that resulted in expanded rights of reproductive choice. In 1972, *Eisenstadt v. Baird* extended the right of contraceptive choice to single people. Harriet represented PPFA in *Roe v. Wade* and *Doe v. Bolton* and played a major part in achieving those landmark victories. She also played a pivotal role in a series of cases in the 1970s in which the Court struck down regulatory measures that had had the practical effect of burdening access to abortion.

Harriet made a particularly powerful contribution to efforts establishing the rights of minors to have access to abortions or contraceptives. She led litigation efforts to gain recognition for minors' privacy rights, beginning with *Carey v. Population Services International* in 1977, which recognized a minor's right to obtain contraceptives without parental consent. She wrote prolifically on this subject, explaining complex issues to family planning providers, legislators, parents and teenagers. Her scholarly work was frequently cited by the Supreme Court and in legislative debate.

In the first eight years following *Roe v. Wade*, Harriet was a wise mentor to the lawyers who litigated the important matter of whether payment for abortions for poor women could be excluded from the otherwise comprehensive Medicaid program, which provides the poor with health insurance coverage. Dozens of states forbade Medicaid from paying for abortions, and in 1977 Congress barred the use of federal Medicaid funds for abortion except in a trivially small number of cases. Harriet's office at Greenbaum,

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Wolff and Ernst became the staging area for a national campaign to challenge these laws. She recruited the seasoned experience of her firm's associates, including Eve W. Paul, Frederic S. Nathan and Nancy F. Wechsler, and fostered respectful and productive relations with a new generation of reproductive freedom litigators, including Janet Benshoof, Rhonda Copelon, Judith Levin, Suzanne Lynn, Ellen K. Sawyer, Nancy Sterns and myself. And she persuaded the firm to provide essential logistical support.

Dozens of federal district and circuit courts found the Medicaid restrictions unconstitutional, but in 1981, the Supreme Court upheld them, in *Harris v. McRae*, by a 5-4 vote. Nevertheless, even though the collaboration failed in the Supreme Court, it succeeded on many other levels. Both the ACLU's Reproductive Freedom Project and the PPFA legal department grew larger, more energetic and more sophisticated. Although the Supreme Court ruled that the Constitution does not require Medicaid funding for abortion, these organizations have persevered politically and legally to assure that the states where most poor women in the United States live still pay for abortions. Harriet's reproductive freedom work also continues through the Harriet Pilpel/Planned Parenthood Fellowship in the Arthur Garfield

Hays Civil Liberties Program at the New York University Law School.

One central lesson of Harriet's remarkable career as a lawyer is her understanding that the development of constitutional principles is a multifaceted and extremely political process. Harriet was a brilliant legal tactician with a deep knowledge of the nuance of doctrine, but she was also acutely attuned to political opinion, organizational politics, the press, religious feeling and the broad cultural forces that shape constitutional principles.

Perhaps the most extraordinary aspect of her career was her enormous capacity for friendship and for human connection. Everyone who worked with Harriet for any period of time appreciated the extent of her devotion to the people she loved: her own children, her friends, and all their children and grandchildren. A special joy of spending time with Harriet was hearing about the wonders of this group of people—her family.

Harriet's imposing manner could be intimidating when it suited her purpose, but that distance was quickly dissipated by her relish in sharing gossip, by her eagerness to confront the hardest question, and by her giggle.

Harriet was an energetic optimist. Despite

the run of recent defeats for reproductive freedom in the Supreme Court, she had hoped for victory this spring, focusing on scraps of evidence of judicial commitment to free expression and to the integrity of the doctor-patient relationship. She believed in the power of law and in the Constitution, and expected the Court to reject the Reagan-Bush effort to regulate the content of doctor-patient communication in Title X clinics. But Harriet did not simply hope and believe; she worked. In the month prior to her death, she had written an opinion piece on the doctor-patient relationship, and told me: "I need to begin another. I need something big and important to chew on in my mind."

Harriet's optimism about the Court's ruling in *Rust v. Sullivan* (page 178) was misplaced, but if she were still here, her fertile mind and vast energy would have quickly led her to campaign to reverse this sad decision in Congress and in the court of public opinion. Harriet helped to create strong institutions that can provide the support that people with high energy and good minds need to continue this work, although the work will be far more difficult without her wise guidance and enthusiasm. For those of us involved in issues of reproductive freedom, Harriet's passing is an immeasurable loss.

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DIGEST

Average Estrogen and Progestin Doses in U.S. Pill Prescriptions Have Fallen Dramatically Since 1964

From 1981 to 1988, the annual number of oral contraceptive prescriptions dispensed at retail pharmacies in the United States remained between 51 and 58 million. Between 1964 and 1980, annual pill prescriptions had fluctuated substantially, reaching a peak of about 65 million in 1973 and a low of less than 45 million in 1979, before leveling off after 1980. The average doses of estrogen and progestin in oral contraceptive prescriptions decreased dramatically between 1964 and 1988. For example, in 1968, fewer than one percent of prescriptions contained less than 50 mcg of estrogen; by 1988, about 82 percent contained less than 50 mcg of estrogen.¹

Using information from the National Prescription Audit (NPA) and the National Disease Therapeutic Index (NDTI), a pair of databases maintained by IMS America, researchers analyzed trends in oral contraceptive prescriptions between 1964 and 1988. The NPA includes only independently owned and chain pharmacies in the contiguous United States, so that other dispensing outlets such as supermarket pharmacies and clinics are not audited. The authors caution that they were unable to estimate the proportion of oral contraceptive prescriptions that the NPA covers; however, other research has found that the NPA accurately reflects trends in oral contraceptive use in the general population. In addition, since the NPA collects information only on the number of prescriptions dispensed and not on the number of cycles covered by each prescription,

their data cannot be used to estimate levels of contraceptive use.

The NDTI audits only office-based physicians; clinic-based or hospital-based doctors are not included. The physicians are asked to provide information on each private patient seen during a 48-hour period.

The total number of prescriptions for oral contraceptives rose fairly steadily between 1964 and the peak year of 1973; during 1973, more than 65 million prescriptions were dispensed. After that, the annual number decreased steadily until 1979, when fewer than 45 million prescriptions were written. In 1980, the number increased somewhat to approximately 46 million, and between 1981 and 1988, the total annual number of oral contraceptive prescriptions remained between 51 million and 58 million.

Up until 1968, the vast majority of oral contraceptive prescriptions were for pills containing more than 50 mcg of estrogen.* In the early 1970s, the proportion of prescriptions with more than 50 mcg of estrogen began to decrease, and after 1975 the decline was rapid. By 1988, only 18 percent of about 57 million pill prescriptions were for formulations containing 50 mcg or more of estrogen. In fact, the mean dose of every type of estrogen and progestin in oral contraceptives declined between 1964 and 1988. (The investigators point out, however, that since norgestrel and levonorgestrel are far more potent than norethindrone, the doses of norgestrel and levonorgestrel in today's oral contraceptives are comparable in potency to the doses of norethindrone in oral contraceptives prescribed in the 1960s and 1970s.)

Throughout the period studied, the proportion of annual prescriptions for pills containing mestranol declined. In 1964, over 90 percent were for pills using mestranol rather than ethinyl estradiol, but by 1981 most pills prescribed in the United States contained the latter. In 1988, approximately 90 percent of pill prescriptions were for formulations containing ethinyl estradiol.

Since 1968, most oral contraceptives prescribed have contained norethindrone, ethynodiol diacetate or norethindrone acetate. From 1970 to 1988, these accounted for about 65 percent of all pill prescriptions. The popularity of levonorgestrel-containing oral contraceptives increased in the 1980s, however, from less than one percent of prescriptions in 1982 to 19 percent in 1988. This trend can be attributed to the increase in prescriptions for two triphasic formulations that contain that progestin. In contrast, the proportion of prescriptions for norgestrel-containing pills decreased from 32 percent of all pill prescriptions in 1983 to 16 percent in 1988.

During the entire period under study, most prescriptions were for monophasic formulations (vs. sequential or multiphasic formulations). The number of prescriptions for sequential formulations, which are no longer available, reached a peak in 1968 and declined steadily in the following years. The popularity of multiphasic formulations rose immediately upon their introduction in 1982. By 1988, they made up 37 percent of all oral contraceptive prescriptions.

The investigators also looked at trends in "mentions" in 1980, 1984 and 1988. (A mention is any time a drug is considered during a doctor-patient meeting.) The total number of mentions for oral contraceptives increased between 1980 and 1988. Although this is true for all age-groups of women 15-44, the proportion of oral contraceptive mentions to 25-34-year-olds increased from 37 percent of all mentions to women aged 15-44 in 1980 to 45 percent in 1988, while the proportion of mentions to 15-24-year-olds decreased from 57 percent to 48 percent during that period. Between 1984 and 1988, the number of mentions for multiphasic formulations more than tripled. In 1988, multiphasics were more likely to be mentioned to women aged 15-24 (48 percent of mentions) than to women 25-44 (31-33 percent).

In 1980 and 1984, the average doses of both ethinyl estradiol and mestranol in oral con-

*Oral contraceptives either consist of both an estrogen and a progestin or consist only of a progestin (mini-pills). Two types of estrogen have been used in oral contraceptives in the United States—ethinyl estradiol and mestranol. The progestin components examined in the study were grouped as follows: norethindrone, ethynodiol diacetate and norethindrone acetate (a derivative of norethindrone), all of which are considered to be of equal potency; norethynodrel (which has not been used in oral contraceptives since October 1988); norgestrel; levonorgestrel; and other progestins not in current use (dimethisterone, chlormadinone and medroxyprogesterone acetate).

traceptive mentions were positively associated with the age of the patient, with physicians more likely to mention higher dose formulations to older patients. In 1988, age was unrelated to average dose: The mean dose mentioned for pills containing ethinyl estradiol was 35 mcg for all age-groups; the mean dose mentioned for mestranol formulations was 56 mcg for women aged 15-24, 54 mcg for those aged 25-34 and 63 mcg for women aged 35-44.

For nearly every age-group in each year, the proportion of mentions for pills containing ethinyl estradiol was higher than the proportion of mentions for those containing mestranol. Only among 35-44-year-olds in 1980 were mentions of mestranol more common than mentions of ethinyl estradiol (53 percent vs. 47 percent). By 1988, just 10 percent of all mentions were for pills containing mestranol.

The researchers conclude that their results point to a need for further studies on the risks associated with using oral contraceptives. Most of the major studies to date have examined the effects of taking oral contraceptives that contained far more estrogen and progestin than are found in current formulations. The investigators point out that the results from those studies may not apply to the oral contraceptives used today, and that "additional risks, if any, are not fully known."—*F. Bind*

Reference

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Proportion of Women With Impaired Fertility Changed Little in 1980s

From 1982 to 1988, the percentage of women aged 15-44 with some kind of fertility impairment remained at 8.4 percent, according to analyses of National Center for Health Statistics data on fecundity and infertility in the United States.¹ There were also no significant changes in the percentages with fertility impairments among childless women, or among women with one or more births. However, the absolute numbers of childless women with fertility impairments have risen, as the 25-44 age-group expands; these older women are more likely to be aware of or to discover fertility impairments, especially because they often delay childbearing.

The study relied primarily on data from Cycles II (1976), III (1982) and IV (1988) of the National Survey of Family Growth (NSFG). The 1988 NSFG, from which most of these data come, was based on personal interviews with a national sample of 8,450 women—2,771 black, 5,354 white and 325

of other races—aged 15-44. The women's ability to have children was measured by asking them if, to their knowledge, they or their husbands were physically unable to conceive or father a child, if they had ever had an operation that would prevent them from conceiving or from carrying a child to term, or if they knew of any other difficulties they would have in doing so.

Impaired Fecundity Among Women

Women classified as having "impaired fecundity" included those who said it was impossible for them to have children for some reason other than sterilizing surgery—such as accident, illness or unexplained inability to conceive—or that it was physically difficult or dangerous for them to conceive or deliver a baby. This classification also included married women who had not become pregnant after 36 months or more of not using contraceptives. About 4.9 million women had impaired fecundity in 1988—about 2.2 million childless women and about 2.7 million women with one or more birth; this amounted to 8.4 percent of all U.S. women, or about one woman in 12. These figures have changed little since 1982.

The number of childless U.S. women aged 35-44 grew between 1982 and 1988 from 1.77 million to 2.90 million. Multiplying these numbers by the percentages of women with impaired fecundity in these years shows an increase in the numbers of women in this age-group with impaired fecundity—from 454,000 in 1982 to 620,000 in 1988, an increase of about one-third. Although this group currently represents only a small percentage of the 57.9 million women of reproductive age, it has grown by 37 percent since 1982. Similarly, among childless women aged 25-34, the number with impaired fecundity increased from about 827,000 to about 972,000 between 1982 and 1988, but the percentage of this group with impaired fecundity did not change significantly.

The number of U.S. women aged 15-24 decreased from 20.2 million in 1982 to 18.6 million in 1988, but the number aged 25-34 increased by about two million, and the number aged 35-44 years increased by more than three million. The percentage of 15-24-year-olds with impaired fecundity was small in both years; among 25-34-year-olds, this percentage was 14.7 percent in 1982 and 13.4 percent in 1988; among 35-44-year-olds, it was 25.7 percent in 1982 and 21.4 percent in 1988. Neither change was statistically significant.

Impaired Fecundity Among Couples

In both 1982 and 1988, 11 percent of all married couples had impaired fecundity. About 21 percent of the 5.5 million married child-

less couples had impaired fecundity in 1988, but this group represents only 3.9 percent of all couples. Impaired fecundity was less common among couples with children (eight percent of such couples in 1982 and 1988).

Although there were no significant changes between 1982 and 1988 in the percentages of all married couples who had impaired fecundity, there were significant decreases in these percentages between 1976 and 1988 among couples with children (from 14 percent to eight percent), and among childless couples in which the woman was aged 25-34 (from 27 percent to 20 percent) or aged 35-44 (from 54 percent to 36 percent).

The overall number of childless couples grew from 565,000 in 1976 to 1,149,000 in 1988, but the percentage of that group with impaired fecundity fell sharply, from 54 percent to 36 percent. Multiplying these numbers by the percentages with impaired fecundity shows that the numbers with impaired fecundity grew over this 12-year period, from 305,000 in 1976 to 408,000 in 1982 and to 418,000 in 1988. As a percentage of all women aged 15-44, or even as a percentage of all married couples, this is not a large increase, but as a percentage of childless women aged 35-44 with impaired fecundity, it is a 20 percent rise from the 1976 level. It is this increase, the researchers suggest, that has led some to believe that the rate of fertility impairments is growing.

Infertility

Infertility is usually defined as the inability to conceive after 12 months or more of intercourse without the use of contraceptives. The researchers point out that infertility is different from impaired fecundity, as infertility is a measure of difficulty in conceiving only; furthermore, it was measured in these national surveys only for married couples, who can be assumed to have intercourse regularly and to report all of their pregnancies. The percentage of couples who were infertile decreased from 11.2 percent in 1965 (according to data from that year's National Fertility Survey) to 8.5 percent in 1982 and to 7.9 percent in 1988. However, trends differed according to parity: In 1965, there were 0.5 million currently married infertile childless women; in both 1982 and 1988, this number was 1.0 million. In 1965, the number of married infertile women who had had one or more birth was 2.5 million, but this number decreased to 1.4 million and 1.3 million in 1982 and 1988, respectively. Overall, there was no significant change in the number infertile from 1982 to 1988.

The number of couples who had sought assistance (beyond routine prenatal care) from a doctor or clinic in becoming pregnant

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or preventing a miscarriage in the past year increased from 1.08 million in 1982 to 1.35 million in 1988. An increase of the same size was observed in the number who had had one or more such visits in the last three years and in the last five years. However, only about two percent of all women had made one or more infertility visits in the last 12 months.

The researchers suggest that a number of factors may help to explain the perception that infertility is rising. Among these are "the many new drugs and techniques for treating infertility, including the new reproductive technologies of in vitro fertilization, artificial insemination, and surrogate motherhood, and news coverage of these techniques"; an increase in the number of physicians trained to treat infertility; and an increased number of visits for infertility.—*R. Turner*

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Hispanic Ethnic Groups Face Variety of Serious Health, Social Problems

The rapidly growing Hispanic population of the United States is young and diverse, and is exposed to a wide variety of health problems, at least in part because of poverty and its associated problems. However, some Hispanic subgroups—the Puerto Rican population in particular—have a much greater risk than others of experiencing serious problems such as low birth weight and infant mortality. Mexican Americans, on the other hand, have better birth outcomes than average, but are more likely than other Hispanic groups to lack health insurance. These are some observations drawn primarily from a group of articles published in a special issue of the *Journal of the American Medical Association* that highlighted the health problems and needs of Hispanic Americans.

The U.S. Hispanic Population

According to data from the March 1990 Current Population Survey (conducted regularly by the U.S. Bureau of the Census), about 20.8 million Americans were classified as

being of Hispanic origin (about 8.4 percent of the U.S. population).¹ Mexican Americans represented 64 percent of all Hispanics, Central and South Americans 14 percent, Puerto Ricans 11 percent, Cubans five percent and other ethnic groups seven percent. The 1990 Census, on the other hand, indicated that 9.0 percent of Americans were Hispanic. Of 22.4 million Hispanics enumerated in the census, 13.5 million (60.4 percent) were Mexican American, 2.7 million (12.2 percent) were Puerto Rican, 1.0 million (4.7 percent) were Cuban and 5.1 million (22.7 percent) were of other Hispanic ethnic origin.²

Seven percent of the 66 million families in the United States in March 1990 were Hispanic. Hispanic households were more likely than non-Hispanic households to contain families (82 percent vs. 70 percent); furthermore, mean family size tended to be greater among Hispanic families (3.82 members) than among non-Hispanic families (3.12). Hispanic families were twice as likely as non-Hispanic families to have five or more members (28 percent vs. 13 percent); among Hispanic families, Mexican-American families were most likely to have five or more members (33 percent).

In March 1990, 80 percent of non-Hispanic families were headed by a married couple, compared with 70 percent of Hispanic families. In contrast, in 23 percent of all Hispanic families, there was a female householder but no husband present, compared with 16 percent of non-Hispanic families. There were marked variations in these percentages by Hispanic origin, with 77 percent of Cuban-American families and 73 percent of Mexican-American families headed by a married couple, compared with only 57 percent of Puerto Rican families. Conversely, 39 percent of Puerto Rican families were headed by a woman, compared with 19 percent of Cuban-American and 20 percent of Mexican-American families.

The U.S. Hispanic population is generally younger than the non-Hispanic population; for example, 30 percent of Hispanics but only 21 percent of non-Hispanics were under 15 years old. The median age of Hispanics (26.0 years) was substantially lower than that of non-Hispanics (33.5 years). Cuban Americans had the highest median age (39.1 years), while Puerto Ricans and Mexican Americans had the lowest median age (27.0 and 24.1 years, respectively).

In 1989, Hispanic households had a median income of \$21,900, substantially lower than the median for non-Hispanic households (\$29,500). The median household income of Puerto Ricans was substantially lower (\$18,900) than that of any other Hispanic ethnic group. Twenty-two percent of

Hispanic households had incomes of below \$10,000, compared with 15 percent of non-Hispanic households. Furthermore, the median family income of Hispanic families was about two-thirds that of non-Hispanic families (\$23,400 vs. \$35,200). Median family income ranged from \$19,900 among Puerto Ricans to \$31,300 among Cubans. Twenty-eight percent of Puerto Rican families had a total family income of less than \$10,000 in 1989.

Twenty-three percent of Hispanic families had incomes below poverty level, compared with just nine percent of non-Hispanic families. Forty-eight percent of Hispanic families and 30 percent of non-Hispanic families living in poverty were headed by women. Puerto Rican and Mexican-American families were most likely to be living in poverty (30 percent and 26 percent). Nearly 48 percent of Hispanics living in poverty were children under age 18.

Reproductive Characteristics

The *Journal of the American Medical Association* recently published a group of research articles and commentaries examining the health status of Hispanic Americans, including a study of Hispanic women's fertility and reproductive behavior based on data from the Hispanic Health and Nutrition Examination Survey (HHANES).³ Although these data—gathered by the National Center for Health Statistics between 1982 and 1984—are not nationally representative, they do represent the dominant Hispanic subgroup in each of three main areas of Hispanic residence: The data on Puerto Ricans are representative of Puerto Ricans in the New York area, those on Mexican Americans are representative of Mexican Americans living in the southwestern United States and those on Cuban Americans are representative of Cuban Americans living in Dade County, Florida. (The investigators assert that these data are likely representative of 76 percent of the U.S. Hispanic population under age 75.) More than 2,500 Hispanic females aged 15–45 were included in the study—1,609 Mexican Americans, 271 Cuban Americans and 674 Puerto Ricans. Not all responded to all of the questions, but in general non-response was minimal.

The mean age of the Mexican-American respondents was 27.9, compared with 28.4 among Puerto Ricans and 31.3 among Cuban Americans. Fifty-seven percent of Mexican Americans and 53 percent of Cuban Americans were married, compared with just 36 percent of Puerto Ricans.

Table 1 shows that Puerto Rican women of reproductive age are more likely to be protected from pregnancy by sterilization than are Cuban or Mexican Americans. The lat-

Table 1. Reproductive characteristics of U.S. Hispanic women aged 15-45,* by ethnic subgroup

Characteristic	Mexican American	Cuban American	Puerto Rican
% sterilized	14.8	15.4	23.0
% using pill	15.7	8.2	8.7
Mean no. of pregnancies	2.4	1.7	2.4
Mean no. of live births	1.9	1.1	1.7
% currently pregnant	5.3	2.4	4.0
% pregnant in past 12 mos.	10.7	9.0	10.1
% currently breastfeeding†	17.2	1.9	1.5

*All percentages and means were adjusted to take into account age-structure differences between ethnic groups, using the pooled Hispanic data as the standard population.

†Among those who had had a birth in the preceding 12 months.

ter, on the other hand, are far more likely to be using oral contraceptives than are Puerto Ricans or Cuban Americans. From another perspective, 20 percent of Mexican Americans considered at risk of pregnancy (fecund and not currently pregnant) use the pill, compared with 11 percent of similar Puerto Ricans and nine percent of similar Cuban Americans (not shown).

Puerto Ricans and Mexican Americans have had an average of 2.4 pregnancies and 1.7-1.9 live births, while Cuban Americans have generally had fewer pregnancies and births. Twenty-four percent of Puerto Ricans and Mexican Americans have experienced at least one miscarriage or stillbirth, compared with about 19 percent of Cuban Americans (not shown).

Mexican Americans and Puerto Ricans were somewhat more likely than Cuban Americans to have been pregnant at the time of the survey or in the preceding year, although the proportions were small. Mexican Americans who had a child in the previous year were far more likely than the others to have been breastfeeding at the time of the survey.

Birth Weight

To examine the incidence of low birth weight among Hispanic newborns, researchers from the Centers for Disease Control (CDC) analyzed the 1983 and 1984 Linked Birth and Infant Death data sets, which contain data on Hispanic ethnicity for births in 23 states and the District of Columbia.⁴ Another study used national vital statistics data for 1987 and supplemented these with results from the HHANES to determine the health status of Hispanic children in the United States.⁵

According to the CDC study, 5.5 percent of Hispanic singleton births during the peri-

od 1983-1984 were of low birth weight, compared with 4.7 percent of births among non-Hispanic whites and 11.5 percent of births among non-Hispanic blacks. Among Hispanic infants, Puerto Rican infants born in Puerto Rico had the highest rate of all (8.3 percent). Among infants born in the continental United States, those of Puerto Rican descent were most likely to be of low birth weight (7.9 percent), while those of Cuban descent were least likely (4.8 percent). Mexican Americans had a rate of 4.9 percent, while other Hispanics (primarily Central and South Americans) had a rate of 5.8 percent. The CDC investigators conclude that "although the birth-weight distribution among infants of Puerto Rican descent correlates to their socioeconomic disadvantage, the same correlation does not apply to [most] other Hispanics in the United States."

The second study finds that in 1987, 6.2 percent of all Hispanic births were of low birth weight, similar to the level among white non-Hispanics (5.6 percent) but far lower than among black non-Hispanics (12.9 percent). Puerto Ricans were more likely to have given birth to a low-birth-weight baby (9.3 percent) than were Cuban Americans (5.9 percent) or Mexican Americans (5.7 percent). Among women who gave birth at age 20 or older, rates of low birth weight were generally slightly lower for mothers born outside the continental United States than for those born in the United States.* However, this relationship was reversed among Cuban-American and Puerto Rican teenagers; indeed, the highest rate of low birth weight in all subgroups (10.3 percent) was among Puerto Rican teenage mothers born in Puerto Rico.

Low birth weight was consistently more common among less-educated Hispanic women (e.g., 7.9 percent among Puerto Ricans with a high school degree and 11.1 percent among those with less than a high school degree). Birth weight was also closely associated with the timing of prenatal care. However, rates of low birth weight remained lowest among Mexican Americans and highest among Puerto Ricans, regardless of when prenatal care began. For example, among those who obtained prenatal care in the third trimester or not at all, 13.6 percent of Puerto Ricans had a low-birth-weight baby, compared with 7.2 percent of Mexican Americans and 11.8 percent of Cuban Americans.

The researchers conclude that Mexican Americans and Cuban Americans "seem to have better outcomes in pregnancy. . . . While this would be expected of Cuban-Americans because of their lower rates of poverty, this is unexpected for Mexican Americans because they have a high rate of poverty similar to that of mainland Puerto Ricans."

Table 2. Mortality rates among Hispanic infants,* by ethnic subgroup, 1983-1984

Ethnic group	Mortality rate		
	Infant	Neo-natal	Postneo-natal
Total	8.7	5.6	3.1
Mexican American	8.3	5.2	3.1
Cuban American	7.0	5.0	2.0
Puerto Rican			
Mainland-born	11.6	7.9	3.7
Island-born	14.9	11.9	3.0
Other	8.4	5.5	3.0

*Singleton births only.

Infant Mortality

The CDC analysis also examined levels of infant mortality among U.S. Hispanics.⁶ The overall infant mortality rate among Hispanics in 1983-1984 (8.7 deaths per 1,000 live births, Table 2) was significantly higher than the rate among whites (8.3 per 1,000). The rate was substantially greater among Puerto Ricans than among Mexican Americans or Cuban Americans.

The rate of neonatal death among Hispanic infants born in 1983-1984 (5.6 deaths per 1,000 live births) was significantly higher than among non-Hispanic whites (5.2 per 1,000), but substantially lower than among non-Hispanic blacks (10.9 per 1,000). Again, the neonatal mortality rate was much higher among Puerto Ricans than among Mexican Americans or among Cuban Americans. Even among Puerto Rican infants of normal birth weight, those born in the continental United States were 40 percent more likely to die in the neonatal period than were non-Hispanic white infants (not shown).

After the neonatal period, Hispanic infants are no more or no less likely than non-Hispanic white infants to die, with rates for both groups being about three deaths per 1,000 infants surviving the neonatal period. In comparison, non-Hispanic blacks had a postneonatal mortality rate of 6.3 per 1,000, twice that of whites. Puerto Ricans had the highest postneonatal mortality rate among Hispanics, while Cuban-Americans had the lowest such rate.

Health Insurance Coverage

Another study used data from the 1989 Current Population Survey (CPS) and from HHANES to examine the health insurance coverage of Hispanic Americans.⁷ The investigators found that Hispanics were much more likely than other Americans to lack insurance coverage: Overall, in 1989, 13 percent of Americans were completely uninsured for medical expenses—10 percent of non-His-

*In 1987, 56 percent of the Hispanic women who gave birth had been born outside the continental United States.

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panic whites, 20 percent of non-Hispanic blacks and 32 percent of Hispanics.

Among Hispanics, Mexican Americans were far more likely to be uninsured (37 percent) than were Puerto Ricans (16 percent) or Cuban Americans (20 percent). One-third of Puerto Ricans were covered by participation in Medicaid, compared with 14 percent of Mexican Americans and 12 percent of Cuban Americans. Cuban Americans, on the other hand, were far more likely than Mexican Americans to have private health insurance (56 percent vs. 44 percent).

HIHANES data showed lower levels of insurance coverage than the CPS data, and indicated that 35 percent of Mexican Americans, 29 percent of Cuban Americans and 22 percent of Puerto Ricans were lacking health insurance. This data set suggests that Puerto Ricans were at least five times as likely as Mexican Americans (34 percent vs. six percent) or Cuban Americans (34 percent vs. seven percent) to be covered by Medicaid.

Hispanics who are uninsured are substantially less likely than others to have a regular source of health care, regardless of ethnicity. For example, only slightly more than 60 percent of uninsured Mexican Americans had a regular health care provider, compared with well over 80 percent of those with some sort of health insurance coverage. The uninsured were also less likely to have visited a physician in the past year: About 33 percent of uninsured Puerto Ricans and 38-40 percent of uninsured Mexican Americans and Cuban Americans had not done so. Furthermore, 30 percent of uninsured Mexican Americans reported that they had never had a routine physical examination, compared with just 10 percent of Cuban Americans and eight percent of Puerto Ricans.

The investigators conclude that "over one-third of the Mexican American population, one-fifth of the Puerto Rican population and over one-fourth of the Cuban American population is at significant risk [of] catastrophic out-of-pocket expenditures for medical care, [of] charity care, or of not receiving medical care when needed."

Improving Hispanic Health

Antonia Novello, Surgeon General of the United States, observes in an editorial that "the Hispanic populations of the United States are diverse, vital and growing. It seems clear that the American health care system will have to recognize this expanding segment

of our society and its strong claim to improved access to high-quality [health] services."⁸ Another commentator observes that because many Hispanic Americans have below-average family incomes, often hold jobs that do not include private health insurance as a benefit, and tend to live in states with low Medicaid enrollments, they are currently "poorly positioned to access the health care system."⁹

The immediate effect of these conditions on Hispanic health, however, is unclear. For example, except for Cuban Americans, Hispanics are generally younger than the general U.S. population, and are therefore concentrated among the age-groups with less need for medical services. On the other hand, they are disproportionately poor, and poverty is strongly associated with poor health.

Several authors observe that risks are not necessarily uniform across all Hispanic populations. For example, Mexican Americans have a significantly higher birthrate than other Hispanic subgroups, and might therefore be expected to need greater access to prenatal care, yet despite their relatively lower access to health care services, their birth-weight patterns more closely resemble those of white non-Hispanic women than those of other Hispanic groups. This is likely to be related at least in part to low levels of smoking and drinking among Mexican-American women. Likewise, urban Hispanics and rural Hispanics often have different lifestyles and face disparate health problems.

According to several of the contributors, the difficulties Hispanic Americans encounter in obtaining health care may be traceable in part to the relative scarcity of health care providers who are Hispanic—only 2-3 percent of dentists, nurses, pharmacists and therapists, and about five percent of physicians. Since only five percent of students enrolled in medical school in the United States are Hispanic, it is unlikely that these percentages will increase soon.

One author suggests that greater emphasis be placed on intensive health education programs conducted by community groups and on the dissemination of Spanish-language materials on preventive health.¹⁰ Other researchers agree, stating that "providing health care to Hispanics will require outreach programs that are capable of penetrating the isolation of urban poverty and bridging rural differences."¹¹

A report by the American Medical Association's Council on Scientific Affairs concludes that "by working with Hispanic health organizations on health promotion and disease prevention through community advertisement and education and by increased recruitment and retention of Hispanic med-

ical students, the medical system can help Hispanics become more involved in their own health care. In addition, Spanish-language preventive health literature can help the less acculturated understand and use the health system appropriately."¹²

In a concluding commentary, two leading Hispanic health researchers identify three groups that must be involved in any attempt to improve Hispanic Americans' access to health services.¹³ The first is the research community, which needs to design and undertake more and better research into differences between ethnic subpopulations and the consequences of immigration patterns and acculturation. In addition, the medical profession must work to make health care more obtainable, both by making special arrangements to bring services to the underserved and by increasing Hispanic participation in the provision of health care. Finally, government must translate "Hispanic health care issues . . . into policy proposals that will capture the attention of the rest of the population."—M. Klitsch

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Among Women Over 30, Rate of First Births Rose Strongly with Education

Although the overall U.S. fertility rate declined between 1980 and 1985, the birthrate among women in their 30s increased during that period—largely a result of an increase in the rate of first births among the most educated women. Educational attainment continues to be an important determinant of when women initiate childbearing in the United States: Among women aged 20–24, the probability of having a first birth is five times greater for those who have not completed high school than for those with a college education. In contrast, among women aged 30–34, those with 16 or more years of education are more than twice as likely to have a first birth as are those with 11 or fewer years of schooling. These are some of the highlights of a 1990 National Center for Health Statistics report examining the relationship between fertility and education.¹

Birthrates

The authors of the report first looked at educational differentials in age-specific birthrates for 1985 among all women (Table 1). The overall birthrate among women aged 15–44 was 65 births per 1,000 women. The association between birthrate and level of education varied according to age-group. Among women aged 20–24, the birthrate initially increased with education between those with eight or fewer years of schooling and those with 9–11 years of schooling. However, the birthrate subsequently decreased among women with 12 or more years of schooling. In contrast, among women aged 30–44, the birthrate decreased with rising education up to a point, and then increased.

The investigators also examined the association of education and birthrate according to marital status (Table 1). Among married women, the age-specific patterns were similar to those for women overall: Among women aged 25 and older, birthrates generally rose with increasing education. Among unmarried women, however, the pattern was completely different: In all age-groups, birthrates decreased with education for unmarried women who had at least a high school education. The drop was most precipitous among women aged 20–24. According to the authors, the low birthrate among “well-educated unmarried women is an indication of their postponement of marriage and childbearing to pursue education and careers.”

Among whites, the birthrate in 1985 was 61 per 1,000, while among blacks it was 82 per 1,000. In almost every age and educa-

tion subgroup, black women had a substantially higher birthrate than white women. The principal exception was among women aged 25–34 who had 13 or more years of schooling: White women in this subgroup had a higher birthrate than black women.

Racial variations in birthrate were also apparent when rates among married and unmarried women were compared. The birthrate among all married women aged 15–44 in 1985 was 90 births per 1,000. The birthrate among married whites was 90 per 1,000, while among married blacks it was 85 per 1,000. White married women with fewer than 12 years of education had a higher birthrate than comparable black women (91 per 1,000 vs. 66 per 1,000), while white women and black women with 16 or more years of education had similar birthrates (108 per 1,000 vs. 103 per 1,000). In contrast, the overall birthrate among unmarried women was 33 births per 1,000 women; among whites, it was 20 per 1,000, and among blacks it was 80 per 1,000. In almost every age and education subgroup, the birthrate among unmarried black women was substantially higher than that among unmarried white women.

Rates of First Births

The overall rate of first births in 1985 was 27 first births per 1,000 women. The associations between age-specific first-birth rates and education were similar to those for age-specific birthrates for all birth orders combined: Among women aged 20–24, the rate of first births increased with education up to 12 years of schooling (66 births per 1,000 women) and then decreased to 29 per 1,000 among those with 16 or more years of education. Among women aged 30 and older, in contrast, the rate of first births decreased up to 9–11 years of schooling and then generally increased with more education. For example, among those aged 30–34, the rate of first births was four per 1,000 women with 9–11 years of education and 36 per 1,000 women with 16 or more years.

The researchers also looked at the probability that women in each age-group and education group would have a first birth. (This measure is a refinement of the rate of first births because it refers only to childless women.) The probability of a childless woman aged 20–24 having a first birth decreased from 159 per 1,000 women with fewer than 12 years of education to 31 per

Table 1. Birthrates among women aged 15–44, by education, according to age-group and marital status, United States, 1985

Age and marital status	Total	Education (yrs.)				
		0–8	9–11	12	13–15	≥16
ALL						
Total	64.7	46.5	62.6	66.3	65.7	66.9
15–19	49.7	31.3	47.8	70.9	23.8	24.7*
20–24	106.7	127.7	178.5	131.9	69.2	36.2
25–29	110.7	91.3	106.4	106.0	133.6	102.8
30–34	67.1	51.6	44.6	49.5	74.5	105.6
35–39	22.7	20.9	15.7	15.7	25.1	37.1
40–44	3.6	5.7	3.1	2.5	3.5	6.6
MARRIED						
Total	90.4	68.1	95.9	80.8	103.1	103.0
15–19	335.6	281.5*	430.8	273.4	402.5*	*
20–24	200.7	148.6	207.0	205.4	219.5	134.8
25–29	148.4	110.8	104.6	132.5	181.8	176.7
30–34	83.2	59.6	44.0	56.8	92.9	148.2
35–39	26.5	22.6	16.0	17.1	30.0	46.4
40–44	4.0	6.9	2.9	2.6	4.0	7.8
UNMARRIED						
Total	32.5	32.5	46.4	40.3	18.9	6.1
15–19	31.7	20.0*	32.6	42.3	12.7	9.0*
20–24	46.9	101.1	150.0	62.8	18.8	4.9
25–29	39.6	63.5	110.5	46.6	35.4	7.0
30–34	23.2	37.8	46.4	26.0	21.7	8.4
35–39	10.3	17.3	15.4	10.5	9.6	5.7
40–44	2.2	3.8	3.5	1.9	1.6	1.6

*Based on fewer than 75,000 women.

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1,000 women with 16 or more years of schooling. Among women aged 25–29, the probability of having a first birth varied somewhat by education from the overall probability of 96 per 1,000 women, with those with 13–15 years of schooling having the greatest chance of having a first birth (120 per 1,000 women). For women aged 30–39, the probability of having a first birth increased with education. For example, the probability among women aged 30–34 increased from 34 per 1,000 women with fewer than 12 years of schooling to 80 per 1,000 women with 16 or more years.

The relationship between education and rates of first births for married women is similar to that between education and birthrates: In all age-groups, rates generally rise with education among women with more than 12 years of schooling. The age-specific association between education and the rate of first births for unmarried women was in sharp contrast to that for all women: There was a clearly negative association between education and the rate of first births among women aged 20–24, but the relationship reversed progressively with increasing age.

Trends

The overall fertility rate among all women 15–44 years old declined slightly between 1980 and 1985, from 67 per 1,000 to 65 per 1,000. However, although the birthrate decreased during that period among women in their 20s, it increased among women in their 30s.

Looking at rates of first births, the investigators observed that the rise between 1980 and 1985 in overall birthrates among women in their 30s was in large part a result of the rise in first births among women with at least some college education: Among women aged 30–34, those with 13–15 and 16 or more years of schooling had birthrates of 13 per 1,000 and 30 per 1,000, respectively, in 1980 and birthrates of 18 per 1,000 and 36 per 1,000, respectively, in 1985.

Among women in their 20s with 16 or more years of schooling, the rate of first births declined between 1980 and 1985: In 1980, the rate among 20–24-year-olds was 40 births per 1,000, compared with 29 per 1,000 in 1985. Comparable rates among women aged 25–29 were 66 per 1,000 and 58 per 1,000. In contrast, the rate of first births increased during this period among women aged 20–29 who had less than a high school education.

To provide a more complete understanding of the trends in births among different educational groups, the authors examined percentage distributions of births and of first births according to education in 1980, 1985 and 1988. The most notable changes were among 35–39-year-olds. For example, in 1980, 26 percent of all births to such women were among those with a college education; the corresponding proportion in 1988 was 40 percent. Over the same period, the proportion of births to women with fewer than 12 years of schooling dropped from 19 percent to nine percent.

Similarly, those with a college education accounted for 44 percent of first births in 1980 among women aged 35–39, 52 percent in 1985 and 53 percent in 1988. The authors contrasted these percentages with the proportions of all women who had a college degree in those years and observed that the educational attainment among mothers experiencing a first birth exceeded that of the general population in both 1980 and 1985: In those two years, the proportions of 35–39-year-old women with a college degree were 18 percent and 24 percent, respectively.

Thus, women with a college education are likely to begin childbearing at a significantly later age than are less-educated women. According to the authors, the “declines in first-birth rates for college-educated women in their 20s appear to confirm that these women are postponing motherhood to pursue further education and careers.” They also noted that the high rates of first births among well-educated women in their 30s “suggest that these . . . women are compensating for earlier postponements of childbearing.”—P. Rind

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Young Dutch Women Are Less Likely than Before To Marry, Bear Children

Young women in the Netherlands are increasingly living alone or cohabiting when they leave their parents’ home, according to data from the 1988 Netherlands Fertility Survey (NFS).¹ Like their counterparts in the United States,² fewer women are marrying, and those who do are marrying later. Trends in childbearing are similar to trends in marriage: More women are remaining childless, and those who are having children are doing so later in life and are having fewer children.

The 1988 NFS collected data from a nationally representative sample of women born in 1950–1969, regardless of marital status, nationality or country of birth. Almost 6,000 women were interviewed, and 700 more were asked to complete an abbreviated questionnaire. Investigators analyzed trends over time by comparing the results from the 1988 NFS with those from the 1982 NFS, which collected data from women born in 1945–1964.

Living Arrangements

In the Netherlands, most young women leave their parents’ home during their early 20s. According to NFS data, 84 percent of 18–19-year-olds were living at home in 1988, compared with 40 percent of 20–24-year-olds. The trend is toward leaving home at older ages: Women born in 1960–1964 were about six months older when they left home than were those born in 1955–1959. Women from small families and those who were working or going to school full-time generally remained with their parents longer than other women.

Increasing numbers of young women cohabit rather than marry when they leave their parents’ home. Among women who left at age 18–22, the proportion who moved directly into a cohabiting arrangement rose from three percent of those born in 1950–1954 to 21 percent of those born in 1960–1964. Meanwhile, the proportion of women leaving their parents’ home at that age to marry fell from 58 percent of those born in 1950–1954 to 26 percent of those born in 1960–1964. These trends were also evident among women who left home at younger and older ages.

Living alone after leaving home has also become more common: Among women who left home when they were 18–22 years old, 23 percent of those born in 1950–1954 lived alone, compared with 32 percent of those born a decade later. As a result of these changes, one-third of women born in 1960–1964 had lived alone before age 23, compared with one-fourth of women born in 1950–1954.

Most women in the Netherlands plan to marry: In 1988, only about five percent of the NFS respondents said they had not married and did not expect that they ever would. But for increasing numbers of women, marriage is preceded by cohabitation: Among women who were 20–24 when they first married, the proportion who cohabited before marrying rose from about 25 percent in 1975–1979 to about 45 percent in 1985–1987.

The 1988 NFS data suggest that cohabiting relationships are less stable than marriages: A comparison of the duration of both cohabiting arrangements and mar-

riages that were begun by 20-24-year-old women during the period 1975-1979 shows that within eight years, 17 percent of the cohabitations had been dissolved, compared with nine percent of the marriages. In addition, first marriages that were preceded by cohabitation were more likely to end in divorce than those that were not. Among 20-24-year-old women whose first marriage occurred in 1975-1979, 15 percent of those who had cohabited before marrying were divorced within eight years, compared with nine percent of those who had not cohabited initially.

Childbearing

Rates of childbearing in the Netherlands have been decreasing among women born since World War II. A comparison of data from the 1982 NFS and the 1988 NFS shows that the proportion of women aged 35-37 who were childless rose from 14 percent to 17 percent in the period between the surveys, while the mean number of children per woman decreased from 1.9 to 1.8.

These changes may be explained in part by a trend toward later initiation of childbearing. For example, by the time they were 25 years old, 63 percent of the women born during the period 1945-1949 had had at least one child, compared with 42 percent of the women born 10 years later. Moreover, almost 30 percent of the 35-37-year-old women who were childless in 1988 expected to have children in the future.

Childbearing outside of marriage, although still uncommon in the Netherlands, is increasing. The proportion of mothers who had never been married rose from three percent in 1982 to five percent in 1988. This trend was particularly apparent among the youngest age-groups: During the same period, the proportion of 18-24-year-old mothers who were unmarried increased from 13 percent to 22 percent. In 1988, more than 40 percent of the unmarried mothers were in cohabiting relationships.

Contraceptive Use

In 1988, 70 percent of the NFS respondents were using a contraceptive method, 22 percent (most of whom had no partner) were not using a method, five percent were pregnant and three percent were infecund. More than half of the women who were practicing contraception were using the pill or injectables, while much smaller proportions relied on sterilization (their own or their partner's), the condom or the IUD.

In the six years between the 1982 and 1988 surveys, the prevalence of hormonal methods increased, while use of the IUD and reliance on female sterilization decreased.

In 1982, the proportion of women who relied on their partner's vasectomy for contraception was almost the same as the proportion of women who were themselves sterilized (seven percent vs. six percent). By 1988, the proportion of women whose partner had had a vasectomy was more than twice the proportion of women who had undergone tubal sterilization (seven percent vs. three percent).

According to the investigators, the findings of the 1988 NFS suggest that "a further decrease of average family size [is] very probable. In the official population forecasts for the Netherlands it is assumed that 190 children will be born to every 100 women born in 1950, compared with about 170 children to women born in 1969."—F. Althaus

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Decision on Cesarean Can Often Be Influenced By Nonclinical Factors

Nonclinical factors figure prominently in the clinical decision to perform either a vaginal delivery after a cesarean or a repeat cesarean. An analysis of 1986 birth data for California shows that repeat cesarean section rates are highest in for-profit proprietary hospitals, nonteaching hospitals, hospitals with a low obstetric caseload and among privately insured patients.¹ These findings remain statistically significant after potentially confounding clinical and nonclinical factors are controlled for. Moreover, findings from a Washington State study using data from 1986 and 1987² indicate that despite the absence of complications, older women giving birth for the first time are more than twice as likely as comparable younger women to deliver by cesarean section; this suggests that maternal age alone greatly influences the clinical decision to perform a cesarean.

The California Study

Using data compiled by the California Office of Statewide Health Planning, which collects information on patients discharged from nonmilitary hospitals, researchers analyzed births occurring in 1986 among women who had previously had a cesarean section.

In 1986, 45,425 births occurred in 316 California hospitals to women who had previ-

ously delivered by cesarean section. Of these births, 89 percent were repeat cesareans, even though just 13 percent of women who had had a previous cesarean section had one or more secondary clinical indications for a repeat cesarean.

Women giving birth in nonprofit University of California hospitals were nearly six times as likely as those delivering in for-profit hospitals to have a vaginal birth after a cesarean section (29 percent vs. five percent); rates of vaginal births (20 percent) in the large group-practice Kaiser Permanente health maintenance organization (HMO) were four times higher. Similarly, hospitals with a formalized teaching program (i.e., members of the Council of Teaching Hospitals) had the highest rates of vaginal birth after a cesarean (23 percent), while nonteaching hospitals had the lowest rate (seven percent).

Vaginal delivery rates also varied by the source of the patient's payment for the operation, with one-quarter of indigent women having a postcesarean vaginal delivery, compared with just eight percent of women with private insurance. Moreover, rates of vaginal delivery after a cesarean section were far higher in hospitals with more than 3,500 annual births than in hospitals with less than 1,000 (17 percent vs. five percent). Vaginal delivery rates after a cesarean were also twice as high in hospitals with a neonatal intensive care unit as in hospitals with no such unit (14 percent vs. seven percent). Finally, women in the lowest socioeconomic group had slightly higher rates than those in the highest (13 percent vs. 10 percent).

The researchers then performed a multiple regression analysis that controlled for potentially confounding effects of nonclinical and clinical factors on the likelihood of a repeat cesarean section. Nonclinical hospital variables known to influence the incidence of repeat cesarean section, and for which the investigators had data, included the type of hospital ownership, the degree to which the hospital is involved in medical training, the volume of obstetric cases, the presence of a neonatal intensive care unit and the source of the patient's payment. The socioeconomic and demographic variables considered were median family income, maternal age (as a proxy for parity) and race and ethnicity. Although a first cesarean section is the primary clinical indication for a second one, conditions such as multiple pregnancy or breech presentation also significantly decrease ($p < .05$) the likelihood of a vaginal delivery after a cesarean; the analysis also controlled for such secondary conditions, provided they were likely to be present before clinical intervention.

DIGEST

After controlling for the independent effects of the nonclinical and clinical variables, the investigators found that women over 25, blacks and Hispanics were less likely than women under 25 and whites to deliver vaginally. Secondary diagnoses (such as cephalopelvic disproportion, breech presentation or multiple pregnancy) all significantly increased the likelihood of repeat cesarean section, independent of other factors.

Although the variation in rates of postcesarean vaginal birth according to different nonclinical factors decreased somewhat after adjustment (because so many of these factors were interrelated), the effects of hospital ownership, source of payment and obstetric volume remained statistically significant. However, for the teaching variable, rates of vaginal births were significantly higher only in Council of Teaching Hospitals members (those with the most formalized teaching programs), compared with nonteaching hospitals (adjusted odds ratio

of 1.7, 95 percent confidence interval of 1.5–1.9). Moreover, the effects of having a neonatal intensive care unit and of socioeconomic status on the likelihood of postcesarean vaginal birth disappeared after statistical adjustment.

Hospital ownership emerged as the strongest independent predictor of the type of delivery after a cesarean section, exceeding the importance of all demographic and clinical factors combined. Other statistically significant nonclinical factors were, in descending order, the volume of obstetric cases, membership in the Council of Teaching Hospitals and the patient's source of payment.

According to the researchers, the finding that rates of postcesarean vaginal birth are significantly higher in the most formalized teaching hospitals may reflect these institutions' unique emphasis on peer review, the scheduling of residents' shifts, and policies encouraging vaginal birth after a cesarean. Similarly, the association between large obstetric volume and higher rates of vaginal birth may stem from the related greater clinical expertise and from around-the-clock scheduling practices, which reduce the incentive for "convenience" cesareans. The researchers suggest that direct financial incentives (or disincentives) are also factors: For-profit hospitals, which have the greatest incentive to maximize reimbursement, have the highest rates of repeat cesareans, while large group-practice HMOs, which are concerned about controlling health care costs, have far lower rates. The researchers also point to the association between patients' source of payment and the type of delivery decision as further evidence: Payment sources reimbursing physicians on a fee-for-service basis were consistently associated with the highest repeat cesarean rates.

The investigators acknowledge that specific data on parity and the number of past cesarean sections would have improved their analysis. Nonetheless, they observe that the higher rates of repeat cesarean sections—which cost almost twice as much as vaginal births—in proprietary hospitals, nonteaching hospitals and those with low obstetric volume "contribute to increased health care expenditures." According to the investigators, the very low rate of postcesarean vaginal delivery in the proprietary hospitals (five percent) is particularly at odds with research suggesting that rates of 70–80 percent can be attained without adverse health effects.

The Washington State Study

In an examination of the influence of maternal age on the likelihood of a first cesarean section, researchers analyzed 1986–1987

birth certificate data from King County, Washington State. After excluding women who had ever had a previous cesarean, those whose babies weighed less than 500 g and those who gave birth to infants with congenital malformations, the researchers compared the delivery experience of 2,985 women aged 30–50 with that of 6,140 women aged 20–29. (Only singleton, hospital-based births were considered.) Multiple logistic regression analyses were performed to control for the mother's race and income and the newborn's birthweight.

Although overall rates of primary cesarean section were similar between the two age-groups, they differed dramatically by parity: Older primiparous women with no complications were 2.5 times as likely to deliver by cesarean section as were younger women with the same characteristics (14 percent vs. six percent), regardless of the mother's race and income and the baby's birthweight. Moreover, among women who had given birth at least once before, older women were 1.6 times as likely to have delivered by cesarean section compared with comparable younger women (3.6 percent vs. 2.3 percent).

The researchers conclude that although women aged 35 and older generally had higher rates of complications and cesarean section, older, primiparous women who had no complications were significantly more likely to undergo a cesarean section despite "no apparent indication" for the intervention. The researchers believe that the extent to which complications were underreported was probably the same in both age-groups; however, the higher cesarean delivery rates among older women could stem, in part, from their tendency to select physicians and facilities that might be more likely to perform cesareans. The rate of primary cesarean section will probably increase as the number of older women giving birth for the first time continues to rise. Given the higher financial and health costs (to both mother and child) associated with cesarean deliveries, the investigators conclude that the high number of "unnecessary cesarean deliveries in older, particularly primiparous women will require greater attention among all obstetric health care providers."—L. Remez

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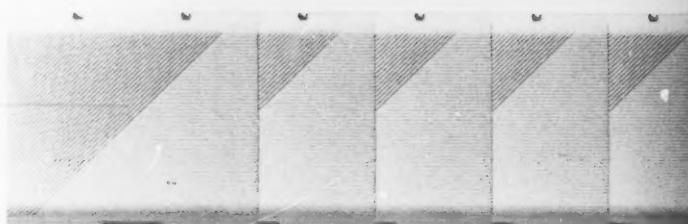
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Reference 1. Data on file, Medical Affairs Dept, Parke-Davis.

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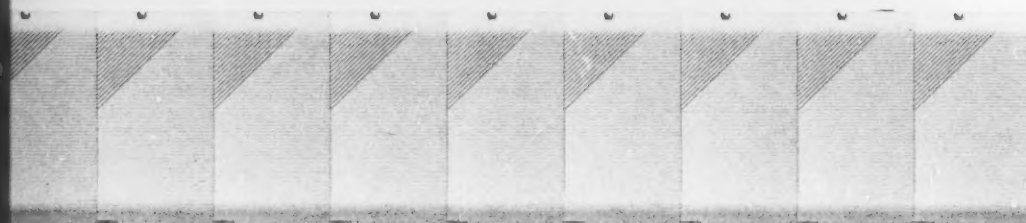
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INDICATIONS AND USAGE: Loestrin 21 and Loestrin Fe are indicated for the prevention of pregnancy in women who elect to use oral contraceptives (OCs) as a method of contraception.

CONTRAINDICATIONS: OCs should not be used in women who currently have the following conditions:

- Thrombophlebitis or thromboembolic disorders.
- A past history of deep vein thrombophlebitis or thromboembolic disorders.
- Cerebral vascular or coronary artery disease.
- Known or suspected carcinoma of the breast.
- Carcinoma of the endometrium or other known or suspected estrogen dependent neoplasia.
- Undiagnosed abnormal genital bleeding.
- Cholestatic jaundice of pregnancy or jaundice with prior pill use.
- Hepatic adenomas or carcinomas.
- Known or suspected pregnancy.

WARNINGS

Cigarette smoking increases the risk of serious cardiovascular side effects from oral contraceptive use. This risk increases with age and with heavy smoking (15 or more cigarettes per day) and is quite marked in women over 35 years of age. Women who use oral contraceptives should be strongly advised not to smoke.

The use of OCs is associated with increased risks of several serious conditions including myocardial infarction, thromboembolism, stroke, hepatic neoplasia, and gallbladder disease, although the risk of serious morbidity or mortality is very small in healthy women without underlying risk factors. The risk of morbidity and mortality increases significantly in the presence of other underlying risk factors such as hypertension, hyperlipidemias, obesity and diabetes. Practitioners prescribing OCs should be familiar with the following information relating to these risks. The information contained in the package insert is principally based on studies carried out in patients who used OCs with higher formulations of estrogens and progestogens than those in common use today. The effect of long-term use of the OCs with lower formulations of both estrogens and progestogens remains to be determined. Throughout this labeling, epidemiological studies reported are of two types: retrospective or case control studies and prospective or cohort studies. Case control studies provide a measure of the relative risk of a disease, namely, a ratio of the incidence of a disease among OC users to that among nonusers. The relative risk does not provide information on the actual clinical occurrence of a disease. Cohort studies provide a measure of attributable risk, which is the difference in the incidence of disease between OC users and nonusers. The attributable risk does provide information about the actual occurrence of a disease in the population. For further information, the reader is referred to a text on epidemiological methods.

1. Thromboembolic Disorders and Other Vascular Problems:

a. Myocardial Infarction: An increased risk of myocardial infarction has been attributed to OC use. This risk is primarily in smokers or women with other underlying risk factors for coronary artery disease such as hypertension, hypercholesterolemia, morbid obesity, and diabetes. The relative risk of heart attack for current OC users has been estimated to be two to six. The risk is very low under the age of 30. Smoking in combination with OC use has been shown to contribute substantially to the incidence of myocardial infarctions in women in their mid-thirties or older with smoking accounting for the majority of excess cases. Mortality rates associated with circulatory disease have been shown to increase substantially in smokers over the age of 35 and nonsmokers over the age of 40 among women who use OCs. OCs may compound the effects of well-known risk factors, such as hypertension, diabetes, hyperlipidemias, age and obesity. In particular, some progestogens are known to decrease HDL cholesterol and cause glucose intolerance, while estrogens may create a state of hyperinsulinism. OCs have been shown to increase blood pressure among users (see section 9 in WARNINGS). Similar effects on risk factors have been associated with an increased risk of heart disease. OCs must be used with caution in women with cardiovascular disease risk factors.

b. Thromboembolism: An increased risk of thromboembolic and thrombotic disease associated with the use of OCs is well established. Case control studies have found the relative risk of users compared to nonusers to be 3 for the first episode of superficial venous thrombosis, 4 to 11 for deep vein thrombosis or pulmonary embolism, and 1.5 to 6 for women with predisposing conditions for venous thromboembolic disease. Cohort studies have shown the relative risk to be somewhat lower, about 3 for new cases and about 4.5 for new cases requiring hospitalization. The risk of thromboembolic disease due to OCs is not related to the amount of use and disappears after pill use is stopped. A two- to four-fold increase in relative risk of postoperative thromboembolic complications has been reported with the use of OCs. The relative risk of venous thrombosis in women who have predisposing conditions is twice that of women without such medical conditions. If feasible, OCs should be discontinued at least four weeks prior to and for two weeks after elective surgery of a type associated with an increase in risk of thromboembolism and during and following prolonged immobilization. Since the immediate postpartum period is also associated with an increased risk of thromboembolism, OCs should be started no earlier than four to six weeks after delivery in women who elect not to breast feed.

c. Cerebrovascular Diseases: OCs have been shown to increase both the relative and attributable risks of cerebrovascular events (thrombotic and hemorrhagic strokes), although, in general, the risk is greatest among older (>35 years), hypertensive women who also smoke. Hypertension was found to be a risk factor for both users and nonusers, for both types of strokes, while smoking interacted to increase the risk for hemorrhagic strokes. In a large study, the relative risk of thrombotic strokes has been shown to range from 3 for normotensive users to 14 for users with severe hypertension. The relative risk of hemorrhagic stroke is reported to be 1.2 for nonusers who used OCs, 2.6 for smokers who did not use OCs, 7.6 for smokers who used OCs, 1.8 for normotensive users and 25.7 for users with severe hypertension. The attributable risk is also greater in older women.

d. Dose-related risk of vascular disease from OCs: A positive association has been observed between the amount of estrogen and progestogen in OCs and the risk of vascular disease. A decline in serum high density lipoproteins (HDL) has been reported with many progestational agents. A decline in serum high density lipoproteins has been associated with an increased incidence of ischemic heart disease. Because estrogens increase HDL cholesterol, the net effect of an OC depends on a balance achieved between doses of estrogen and progestogen and the nature and absolute amount of progestogens used in the contraceptives. The amount of both hormones should be considered in the choice of an OC. Minimizing exposure to estrogen and progestogen is in keeping with good principles of therapeutics. For any particular estrogen/progestogen combination, the dosage regimen prescribed should be one which contains the least amount of estrogen and progestogen that is compatible with a low failure rate and the needs of the individual patient. New acceptors of OC agents should be started on preparations containing the lowest dose of estrogen which produces satisfactory results for the patient.

e. Persistence of risk of vascular disease: There are two studies which have shown persistence of risk of vascular disease for ever users of OCs. In a study in the United States, the risk of developing myocardial infarction after discontinuing OCs persists for at least 9 years for women 40-49 years who had used OCs for 5 or more years, but this increased risk was not demonstrated in other age groups. In another study in Great Britain, the risk of developing cerebrovascular disease persisted for at least 6 years after discontinuation of OCs, although excess risk was very small. However, both studies were performed with OC formulations containing 50 micrograms or higher of estrogen.

2. Estimates of Mortality from Contraceptive Use: One study gathered data from a variety of sources which have estimated the mortality rate associated with different methods of contraception at different ages. These estimates include the combined risk of death associated with contraceptive methods plus the risk attributable to pregnancy in the event of method failure. Each method of contraception has its specific benefits and risks. The study concluded that with the exception of OC users 35 and older who smoke and 40 and older who do not smoke, mortality associated with all methods of birth control is low and below that associated with childbirth. The observation of a possible increase in risk of mortality with age for OC users is based on data gathered in the 1970's - but not reported until 1983. However, current clinical practice involves the use of lower estrogen dose formulations combined with careful restriction of OC use to women who do not have the various risk factors listed in this labeling. Because of these changes in practice and also, because of some limited new data which suggest that the risk of cardiovascular disease with the use of OCs may now be less than previously observed (Porter JB, Hunter J, Jack H, et al. Oral contraceptives and nonfatal vascular disease. *Obstet Gynecol* 1985;66:14 and Porter JB, Hunter J, Walker A. Mortality among oral contraceptive users. *Obstet Gynecol* 1987;70:273-82), the Fertility and Maternal Health Drugs Advisory Committee was asked to review the topic in 1989. The Committee concluded that although cardiovascular disease risks may be increased with OC use after age 40 in healthy nonsmoking women (even with the newer low dose formulations), there are greater potential health risks associated with pregnancy in older women and with the alternative surgical and medical procedures which may be necessary if such women do not have access to effective and acceptable means of contraception. Therefore, the Committee recommended that the benefits of OC use by healthy nonsmoking women over 40 may outweigh the possible risks. Of course older women, as all women who take OCs, should take the lowest possible dose formulation that is effective.

3. Carcinoma of the Reproductive Organs: Numerous epidemiological studies have been performed on the incidence of breast, endometrial, ovarian and cervical cancer in women using OCs. Most of the studies on breast cancer and OC use report that the use of OCs is not associated with an increase in the risk of developing breast cancer. Some studies have reported an increased risk of developing breast cancer in certain subgroups of OC users but the findings reported in these studies are not consistent. Some studies suggest that OC use has been associated with an increase in the risk of cervical intraepithelial neoplasia in some populations of women. However, there continues to be controversy about the extent to which such findings may be due to differences in sexual behavior and other factors. In spite of many studies of the relationship between OC use and breast and cervical cancers, a cause and effect relationship has not been established.

4. Hepatic Neoplasia: Benign hepatic adenomas are associated with OC use, although the incidence of benign tumors is rare in the United States. Indirect calculations have estimated the attributable risk to be in the range of 3.3 cases/100,000 for users, a risk that increases after four or more years of use. Rupture of rare, benign, hepatic adenomas may cause death through intra-abdominal hemorrhage. Studies from Britain have shown an increased risk of developing hepatocellular carcinoma in long-term (>8 years) OC users. However, these cancers are extremely rare in the US, and the attributable risk (the excess incidence) of liver cancers in OC users approaches less than one per million users.

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5. Ocular Lesions: There have been clinical case reports of retinal thrombosis associated with the use of OCs. OCs should be discontinued if there is unexplained partial or complete loss of vision, onset of proptosis or diplopia, papilledema, or retinal vascular lesions. Appropriate diagnostic and therapeutic measures should be undertaken immediately.

6. OC Use Before or During Early Pregnancy: Extensive epidemiological studies have revealed no increased risk of birth defects in women who have used OCs prior to pregnancy. Studies also do not suggest a teratogenic effect, particularly insofar as cardiac anomalies and limb reduction defects are concerned, when taken inadvertently during early pregnancy. The administration of OCs to induce withdrawal bleeding should not be used as a test for pregnancy. OCs should not be used during pregnancy to treat threatened or habitual abortion. It is recommended that for any patient who has missed two consecutive periods, pregnancy should be ruled out before continuing OC use. If the patient has not adhered to the prescribed schedule, the possibility of pregnancy should be considered at the time of the first missed period. OC use should be discontinued if pregnancy is confirmed.

7. Gallbladder Disease: Earlier studies have reported an increased lifetime relative risk of gallbladder surgery in users of OCs and estrogens. More recent studies, however, have shown that the relative risk of developing gallbladder disease among OC users may be minimal. The recent findings of minimal risk may be related to the use of OC formulations containing lower hormonal doses of estrogens and progestogens.

8. Carbohydrate and Lipid Metabolic Effects: OCs have been shown to cause glucose intolerance in a significant percentage of users. OCs containing greater than 75 micrograms of estrogens cause hyperinsulinism, while lower doses of estrogen cause less glucose intolerance. Progestogens increase insulin secretion and create insulin resistance, this effect varying with different progestational agents. However, in the nondiabetic woman, OCs appear to have no effect on fasting blood glucose. Because of these demonstrated effects, prediabetic and diabetic women should be carefully observed while taking OCs. A small proportion of women will have persistent hyperglycemia while on the pill. As discussed earlier (see WARNINGS 1a and 1d), changes in serum triglycerides and lipoprotein levels have been reported in OC users.

9. Elevated Blood Pressure: An increase in blood pressure has been reported in women taking OCs, and this increase is more likely in older OC users and with continued use. Data from the Royal College of General Practitioners and subsequent randomized trials have shown that the incidence of hypertension increases with increasing concentrations of progestogens. Women with a history of hypertension or hypertension-related diseases, or renal disease, should be encouraged to use another method of contraception. If women elect to use OCs, they should be monitored closely and if significant elevation of blood pressure occurs, OCs should be discontinued. For most women, elevated blood pressure will return to normal after stopping OCs, and there is no difference in the occurrence of hypertension among ever and never users.

10. Headache: The onset or exacerbation of migraine or development of headache with a new pattern which is recurrent, persistent or severe requires discontinuation of OCs and evaluation of the cause.

11. Bleeding Irregularities: Breakthrough bleeding and spotting are sometimes encountered in patients on OCs, especially during the first three months of use. Nonhormonal causes should be considered and adequate diagnostic measures taken to rule out malignancy or pregnancy in the event of breakthrough bleeding, as in the case of any abnormal vaginal bleeding. If pathology has been excluded, time or a change to another formulation may solve the problem. In the event of amenorrhea, pregnancy should be ruled out. Some women may encounter postpill amenorrhea or oligomenorrhea, especially when such a condition was preexistent.

PRECAUTIONS:

1. Physical Examination and Follow-Up: A complete medical history and physical examination should be taken prior to the initiation or reinitiation of OCs and at least annually during use of OCs. These physical examinations should include special reference to blood pressure, breasts, abdomen and pelvic organs, including cervical cytology, and relevant laboratory tests. In case of undiagnosed, persistent or recurrent abnormal vaginal bleeding, appropriate diagnostic measures should be conducted to rule out malignancy. Women with a strong family history of breast cancer or who have breast nodules should be monitored with particular care.

2. Lipid Disorders: Women who are being treated for hyperlipidemia should be followed closely if they elect to use OCs. Some progestogens may elevate LDL levels and may render the control of hyperlipidemia more difficult.

3. Liver Function: If jaundice develops in any woman receiving such drugs, the medication should be discontinued. Steroid hormones may be poorly metabolized in patients with impaired liver function.

4. Fluid Retention: OCs may cause some degree of fluid retention. They should be prescribed with caution, and only with careful monitoring, in patients with conditions which might be aggravated by fluid retention.

5. Emotional Disorders: Women with a history of depression should be carefully observed and the drug discontinued if depression recurs to a serious degree.

6. Contact Lenses: Contact lens wearers who develop visual changes or changes in lens tolerance should be assessed by an ophthalmologist.

7. Drug Interactions: Reduced efficacy and increased incidence of breakthrough bleeding and menstrual irregularities have been associated with concomitant use of rifampin. A similar association, though less marked, has been suggested with barbiturates, phenylbutazone, phenytoin sodium, and possibly with prochlorperazine, ampicillin and tetracyclines.

8. Interactions with Laboratory Tests: Certain endocrine and liver function tests and blood components may be affected by OCs.

a. Increased prothrombin and factors VII, VIII, IX, and X, decreased antithrombin III, increased norepinephrine-induced platelet aggregability.

b. Increased thyroid-binding globulin (TBG) leading to increased circulating total thyroid hormone, as measured by protein-bound iodine (PBI), T₄ by column or by radioimmunoassay. Free T₃ resin uptake is decreased, reflecting the elevated TBG. Free T₄ concentration is unaltered.

c. Other binding proteins may be elevated in serum.

d. Sex-binding globulins are increased and result in elevated levels of total circulating sex steroids and corticoids; however, free or biologically active levels remain unchanged.

e. Triglycerides may be increased.

f. Glucose tolerance may be decreased.

g. Serum folate levels may be depressed by OC therapy. This may be of clinical significance if a woman becomes pregnant shortly after discontinuing OCs.

9. Carcinogenesis: See **WARNINGS** section.

10. Pregnancy: Pregnancy Category X. **CONTRAINDICATIONS** and **WARNINGS** sections.

11. Nursing Mothers: Small amounts of OC steroids have been identified in the milk of nursing mothers and a few adverse effects on the child have been reported, including jaundice and breast enlargement. In addition, OCs given in the postpartum period may interfere with lactation by decreasing the quantity and quality of breast milk. If possible, the nursing mother should be advised not to use OCs but to use other forms of contraception until she has completely weaned her child.

INFORMATION FOR THE PATIENT: See patient labeling.

ADVERSE REACTIONS: An increased risk of the following serious adverse reactions has been associated with the use of OCs (see **WARNINGS** section). Thrombophlebitis, arterial thromboembolism, pulmonary embolism, myocardial infarction, cerebral hemorrhage, cerebral thrombosis, hypertension, gallbladder disease, hepatic adenomas or benign liver tumors. There is evidence of an association between the following conditions and the use of OCs, although additional confirmatory studies are needed: Mesenteric thrombosis, retinal thrombosis. The following adverse reactions have been reported in patients receiving OCs and are believed to be drug-related: Nausea, vomiting, gastrointestinal symptoms (such as abdominal cramps and bloating), breakthrough bleeding, spotting, change in menstrual flow, amenorrhea, temporary infertility after discontinuance of treatment, edema, melasma which may persist, breast changes: tenderness, enlargement, secretion, change in weight (increase or decrease), change in cervical erosion and secretion, diminution in lactation when given immediately postpartum, cholestatic jaundice, migraine, rash (allergic), mental depression, reduced tolerance to carbohydrates, vaginal candidiasis, change in corneal curvature (steepening), intolerance to contact lenses. The following adverse reactions have been reported in users of OCs and the association has been neither confirmed nor refuted: Premenstrual syndrome, catarrhs, changes in appetite, cystitis-like syndrome, headache, nervousness, dizziness, hirsutism, loss of scalp hair, erythema, alopecia, otitis media, otitis externa, rhinitis, sinusitis, hemorrhagic eruption, vaginitis, porphyria, impaired renal function, hemolytic uremic syndrome, Budd-Chiari syndrome, acne, changes in libido, colitis.

OVERDOSEAGE: Serious effects have not been reported following acute ingestion of large doses of OCs by young children. Overdose may cause nausea, and withdrawal bleeding may occur in females.

HOW SUPPLIED:

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Loestrin Fe 1/20 is available in dispensers each containing 21 white tablets and 7 brown tablets. Each white tablet contains 1 mg of norethindrone acetate and 20 mcg of ethinyl estradiol. Each brown tablet contains 75 mg ferrous fumarate. Available in packages of five dispensers.

Loestrin 21 1/50 is available in dispensers each containing 21 tablets. Each tablet contains 1.5 mg of norethindrone acetate and 30 mcg of ethinyl estradiol. Available in packages of five dispensers.

Loestrin Fe 1/50 is available in dispensers each containing 21 green tablets and 7 brown tablets. Each green tablet contains 1.5 mg of norethindrone acetate and 30 mcg of ethinyl estradiol. Each brown tablet contains 75 mg ferrous fumarate. Available in packages of five dispensers.

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UPDATE

Wichita Protests Lacked Support

More than three-quarters of Americans aware of the tactics of antiabortion demonstrators in Wichita over summer 1991 disapproved of those tactics, according to a recent Gallup poll, and more than four out of five believed that such activities harm the antiabortion movement.¹ The Gallup Organization polled a random selection of 1,005 adults September 5-8, and found that 63 percent had heard or read about Operation Rescue's repeated attempts to block women's access to Wichita abortion clinics. Among these respondents, 77 percent said they disapproved of these activities—92 percent of those who opposed overturning the Supreme Court's *Roe v. Wade* decision and 57 percent of those who favored doing so. They were evenly split, however, over the Bush Administration's response to the demonstrations, with 36 percent approving of it, 35 percent disapproving and 29 percent having no opinion. Among all respondents, 71 percent believed that personal confrontations with pregnant women trying to enter an abortion clinic were damaging to the antiabortion cause, and 86 percent thought that blockades of entrances to clinics hurt the antiabortion movement.

1. L. Hugick, "Pro-Life' Wichita Demonstrations Fail to Change Opinion on Abortion," press release, The Gallup Poll News Service, Sept. 11, 1991.

Is the Postcoital Pill Effective?

The ability of postcoital contraception to prevent accidental conception may be overestimated.¹ French researchers reviewed data from 10 past studies of postcoital contraception, five evaluating the efficacy of estrogen given within 48 hours of unprotected intercourse and five examining the effectiveness of high doses of combined oral

contraceptives taken over the same time period. These 10 studies found failure rates of anywhere from zero percent to two percent. However, the researchers observe that not all of the women who participated in these studies would have been capable of becoming pregnant at the time they had unprotected intercourse. The investigators used two independent methods to estimate the number of women in the 10 studies who might have been expected to become pregnant, given the time in the cycle at which unprotected intercourse took place. Upon contrasting these estimates with the reported number of pregnancies, the researchers found that one method produced pregnancy rates for the 10 studies ranging from zero to 48 percent for estrogen used alone, and from four to 100 percent for the combined pill; the other produced ranges of 0-16 percent and 6-44 percent, respectively. The investigators conclude that the variation in pregnancy risk "casts some doubt on the efficacy of postcoital contraception."

1. L. Sylvestre, Y. Bouali and A. L'Abbe, "Postcoital Contraception: Myth or Reality?" *Lancet*, 338:39, 1991.

HIV Testing Costs Exceed Benefits

A company would probably spend more money testing prospective or current employees for human immunodeficiency virus (HIV) infection than it would save in AIDS-related health care costs if management were permitted to base personnel decisions on the test results.¹ Economists from Columbia University calculated the likely costs of HIV testing for various sizes and types of businesses, as well as the potential savings in health care costs if the companies could use such tests to dismiss HIV-positive individuals. (It is currently against the law to conduct such screening.) A comparison of the costs and the potential savings led the investigators to observe that HIV testing would not prove beneficial for most small companies; even large businesses would likely benefit only if their em-

ployees were drawn disproportionately from a high-prevalence population and if the company offered generous fringe benefits. "Most profit-maximizing employers are not likely to find HIV testing to be a cost-beneficial personnel policy," they conclude.

1. D. E. Bloom and S. Glied, "Benefits and Costs of HIV Testing," *Science*, 252:1798, 1991.

Aspirin Beats Preeclampsia

Women who take low doses of aspirin during pregnancy appear to be at reduced risk of pregnancy-induced hypertension (preeclampsia), and their babies appear to be at decreased risk of low birth weight.¹ Because clinical studies of aspirin's effect on preeclampsia have often involved small numbers of patients and sometimes reached contradictory conclusions, two investigators performed a meta-analysis of the six such studies that have been conducted. (Meta-analysis is a relatively new research method that permits researchers to pool the results of a number of smaller studies, thus increasing their ability to detect statistically significant effects.) The meta-analysis revealed that pregnant women who took 60-150 mg of aspirin each day during the second and third trimesters were 65 percent less likely than comparison women to have experienced preeclampsia; the study also indicated that, on average, only a little more than four women would have to be treated in order to prevent one case of preeclampsia. Aspirin consumption also appears to have reduced the likelihood of severe low birth weight by 44 percent. The investigators conclude that their "overall results suggest that low-dose aspirin significantly reduces the risks of pregnancy-induced hypertension and severe low birth weight among newborn infants."

1. T. F. Imperiale and A. S. Petrucci, "A Meta-analysis of Low-Dose Aspirin for the Prevention of Pregnancy-Induced Hypertensive Disease," *Journal of the American Medical Association*, 266:260, 1991.

Update was compiled and written by Michael Klitsch, Editor of *Family Planning Perspectives*.

Politics of Sex Halts Youth Survey

On July 23, Health and Human Services secretary Louis Sullivan unexpectedly cancelled a National Institutes of Health-sponsored survey of 24,000 U.S. teenagers in grades 7-11.¹ The nationally representative panel study was intended to investigate adolescent sexual and contraceptive behavior from a broad perspective, with interviews of parents and school officials and analyses of the participants' friendship networks. Sullivan's decision came after conservative legislators objected to the survey and after he had faced questions about the survey on a television talk show. In a statement about the decision, Sullivan argued that the study "could inadvertently convey a message undermining [his] warnings about the dangers of promiscuous sex." J. Richard Udry, one of the principal investigators, reported that as of early September, the only official explanation that the researchers had received was a letter stating that the study was "not consistent with department policy."² At about the same time, U.S. Representative William Dannemeyer attempted to amend the National Institutes of Health authorization bill to ban all future sex surveys; instead, the House passed a bill permitting such surveys if they have passed several levels of ethical and peer review.

1. "Sullivan Overrules NIH on Sex Survey," *Science*, 253:502, 1991.

2. J. R. Udry, personal communication, Sept. 11, 1991.

Postponing Infant Mortality

Rates of infant mortality declined by 18 percent in Tennessee during the 1980s, with the most impressive improvements among very low birth weight infants during the neonatal period. Postneonatal mortality related to prematurity rose substantially among very low birth weight babies, however, suggesting that technological innovation has increased medicine's ability to postpone death rather than to prevent it.¹ A researcher from the National Center for Health Statistics analyzed infant mortality data from Tennessee for the periods 1979-1983 and 1984-1988, and found that overall infant mortality rates fell from 10.2 deaths per 1,000 live births to 8.4 per 1,000. The decline in neonatal mortality was somewhat greater than the decrease in postneonatal mortality. Neonatal mortality rates decreased most among very low birth weight infants, from 332 deaths per 1,000 live births to 252 per 1,000; however, postneonatal mortality among such babies actually rose slightly, from 40 deaths per 1,000 to 45 per 1,000. Moreover, analyses of causes of death revealed that while the rate of neonatal deaths among very low birth

weight infants that were related directly to prematurity fell from 242 deaths per 1,000 to 178 per 1,000, the rate of prematurity-related postneonatal deaths rose from three per 1,000 to 18 per 1,000. The author concludes that "more of these fragile newborns are surviving the neonatal period only to die later of the complications of preterm birth."

1. J. M. Piper, "Preventing and Postponing Death: Trends in Tennessee Infant Mortality," *American Journal of Public Health*, 81:1046, 1991.

Pregnancy Less Likely After Age 31

Women's ability to become pregnant appears to peak at around age 31 and to decline steadily thereafter, as does the likelihood that a pregnant woman will bear a healthy child.¹ A British study of 751 nulliparous women aged 18-42 who were having artificial insemination revealed that 555 (74 percent) became pregnant and 461 (61 percent) had a healthy baby. Overall, 35-39-year-olds were about half as likely to have become pregnant as were younger women. When the researchers graphed the pregnancy rate per cycle by the women's age, they found that the probability of pregnancy was fairly stable until after age 31. The investigators comment that their findings indicate that "women older than 31 will take longer to become pregnant . . . than would younger women." They also discovered that up to age 30, a woman who became pregnant had an 89 percent chance of having a healthy baby; for each year of age greater than 30, this likelihood decreased by 3.5 percent.

1. B. M. van Noord-Zaadstra et al., "Delaying Childbearing: Effect of Age on Fecundity and Outcome of Pregnancy," *British Medical Journal*, 302:1361, 1991.

Strong UK Support for Abortion

Four out of five Britons believe a woman should have an unrestricted right to choose to have an abortion in the first three months of pregnancy.¹ A Harris poll found that 84 percent of women and 78 percent of men supported this right. Respondents aged 18-24 in particular were strongly supportive of the right to obtain an abortion, with 90 percent agreeing that a woman should be free to make that decision, but even among respondents aged 65 and older, 77 percent supported a woman's right to decide to have an abortion. At present, a woman in Great Britain can obtain an abortion only after she has received the approval of two physicians; thus, British public opinion appears to support abortion access well beyond what is currently legal.

1. "81% Want Choice: Poll Shows Highest Ever Support for Abortion on Request," *Breaking Chains: The Newspaper of the Abortion Law Reform Association*, No. 52, Summer 1991.

Less Mifepristone Is Just as Good

The antiprogesterone mifepristone (popularly known as RU 486) appears to be just as effective at inducing early first-trimester abortions if it is administered at substantially lower doses than those generally given.¹ A recent World Health Organization study found that complete abortions occurred among 93 percent of the 181 women who received five 25-mg doses of mifepristone at 12-hour intervals and a prostaglandin 48 hours afterward. The comparable rate of complete abortions among women who received the usual single dose of 600 mg was 92 percent. The two groups did not differ in terms of the duration or amount of bleeding that they experienced, and there were almost no differences in the occurrence of side effects. The authors of the study conclude that "the two mifepristone regimens employed are equally effective for termination of early pregnancy," and add that further multicenter trials now underway will be used to determine the minimum effective dose of mifepristone.

1. World Health Organization, "Pregnancy Termination with Mifepristone and Gemeprost: A Multicenter Comparison Between Repeated Doses and a Single Dose of Mifepristone," *Fertility and Sterility*, 56:32, 1991.

Targeted HIV Screening Fails

Four clients of a prenatal and family planning clinic in Los Angeles tested positive for human immunodeficiency virus (HIV) after having been missed by the clinic's targeted screening program.¹ Researchers checked for HIV in serum samples from 3,000 women tested for syphilis; 77 percent admitted no behavior that would place them at risk of HIV infection, and only 50 had engaged in "high risk" activities (intravenous drug use, sex in exchange for money or drugs, or sex with an intravenous drug user, male bisexual or HIV-infected partner). However, three of the four women who tested positive had reported no risk factors for HIV infection, and thus were never offered HIV screening; the fourth cited one risk factor but refused testing. The investigators note that overall, only 14 percent of the women with one or more risk factors for HIV infection were willing to be tested, including just 28 percent of those thought to be at high risk. They conclude that "a strategy of selectively offering HIV voluntary testing only to those women who report risk factors for infection may result in a low rate of acceptance and may miss seropositive women."

1. L. J. Fehrs et al., "Targeted HIV Screening at a Los Angeles Prenatal/Family Planning Health Center," *American Journal of Public Health*, 81:619, 1991.

Family Planning Clinics: Facing Higher Costs and Sicker Patients

By Patricia Donovan

Summary

Family planning clinics throughout the United States are facing a variety of obstacles that threaten their ability to provide necessary contraceptive services to low-income women and teenagers, according to interviews with clinic administrators. In the last few years, the proportion of patients coming to family planning agencies in need of screening or treatment for sexually transmitted diseases (STDs) has increased dramatically. Many providers report that 10–15 percent of their clients are infected with chlamydia, the most prevalent STD.

The increasing costs of Pap tests and contraceptives are also major problems: As a result of recent federal legislation, the price of Pap tests has risen substantially, and that of contraceptives is beginning to increase steeply. Finally, Title X funding for family planning services has decreased 66 percent over the last decade if both cuts and inflation are taken into account.

As a result of the squeeze between increased costs and decreased public funding, clinics have been forced to charge higher fees, maintain long waiting lists for appointments and curtail community outreach. In addition, growth of the family planning patient population has slowed dramatically, and even declined, in some places.

Introduction

As family planning agencies around the country face rapidly escalating costs and demands for medical care, many providers worry that their resources are being diverted from the original goal of providing basic contraceptive services to low-income women. The combined impact of an explosion in the number of patients infected with sexually transmitted diseases (STDs), the AIDS crisis, and the soaring costs of the Pap smear (resulting from new federal restrictions

STDs have become so rampant among patients in many family planning programs that providers worry that their agencies are turning into STD clinics. Some agencies now spend more on medications than on birth control methods.

on clinical laboratories) is straining agency budgets already stretched thin by years of inadequate funding. In addition, family planning agencies are beginning to face steep increases in the prices of oral contraceptives and other medications; administrators say this could pose the final blow to the fiscal stability of the national family planning program. Administrators cite the following as examples of their growing problems:

- Forty percent of all medical visits to Planned Parenthood of Wisconsin in 1990 involved testing or treatment for STDs, compared with only 10 percent of visits in 1980.¹
- Family planning clinics in New York State have to absorb an estimated \$2 million annually in unreimbursed costs related to testing and treatment for STDs.²
- The laboratory charge for a Pap smear soared from \$2.75 to \$10 between August 1990 and January 1991 for most family planning clinics funded through the Colorado Health Department.³
- The number of abnormal Pap tests requiring follow-up of patients increased 30 percent in three years at Women's Health Services in Clinton, Iowa.⁴
- The Mississippi Health Department's family planning program will have to pay almost \$250 thousand more for birth control pills in 1991 than it paid in 1990.⁵

Although family planning clinics are operated by various types of agencies, including health departments, Planned Parenthood affiliates and other nonprofit organizations and hospitals, virtually all types of family planning providers are affected by the current crisis. This article, developed through interviews during the first half of 1991 with more than 50 administrators and directors

of family planning agencies, explores the most pressing problems currently confronting family planning providers.

Sicker Patients

Family planning patients are coming to clinics with more health problems than they were a few years ago, and often they have no other source of medical care, agency directors say. In response to their patients' needs for health care, family planning providers frequently screen for diabetes, colon cancer and high cholesterol; offer prenatal care and smoking cessation programs as well as "midlife" protocols for older patients who need mammograms and estrogen and calcium replacement therapies; conduct counseling on drug and alcohol abuse, eating disorders and nutrition; and provide assistance to rape victims.

"We are seeing patients who are sicker and receive no [other] health care," reports Sandy Anderson, executive director of Planned Parenthood of Southern Indiana. "There are no doctors in many places, and [our patients] can't afford doctors anyway."

"Many [of our clients] don't see any other health provider unless they are pregnant or get run over by a truck," adds Kay Trusdale, executive director of Family Planning Program, Inc., the only provider of subsidized family planning services in Tulare County, California.

Providers report that they are seeing premalignant changes in the cervix (known as dysplasia) and cervical cancer among younger and younger women (some in their teens), and that many of their patients are infected with more than one STD. "We just don't have healthy clients anymore," ob-

Patricia Donovan is contributing editor for law and public policy of *Family Planning Perspectives*.

serves Joan Henneberry, director of the family planning program in the Colorado Health Department.

The Explosion of STDs

STDs have become so rampant among patients in many family planning programs that providers worry that their agencies are turning into STD clinics. "It used to be that an occasional family planning patient had an STD; now it is an occasional . . . patient who doesn't have [one]," notes Dorothy Mann, executive director of the Family Planning Council of Southeastern Pennsylvania. As a result, Mann says, the Council, which purchases contraceptives and drugs for 21 agencies in a five-county area around Philadelphia, now spends more on medications than on birth control methods. "Five to eight years ago . . . I spent \$3 on contraceptives for every \$1 on therapeutics. Now that [ratio] is flipping."

The rise in STDs among family planning patients reflects the dramatic increase in the number of such diseases during the last decade. Until the early 1980s, there were only five readily recognized STDs, with gonorrhea and syphilis by far the most common. Now there are more than 50 organisms and syndromes that are known to be transmitted sexually, and more than 12 million cases of STDs are estimated to occur each year, including three million among teenagers. In addition, an estimated one million Americans are infected with human immunodeficiency virus (HIV).⁶

STDs can lead to pelvic inflammatory disease (PID), infertility, cancer, ectopic pregnancy, infant pneumonia and death, mental retardation and immune deficiencies.⁷ AIDS and syphilis can also result in the death of infected individuals. Sixty-three percent of all STDs occur in persons under the age of 25.⁸ "We're a public health program," observes Mann. "What happens in public health affects family planning, and what is happening to women in their reproductive years is STDs and AIDS."

A recent nationwide survey of family planning clinics, conducted by the State Family Planning Administrators (SFPA) in Seattle, supports Mann's observations. On average, an estimated 13 percent of patients at the 410 agencies surveyed were diagnosed with an STD within the past year; one-third of the providers reported that 10–20 percent of their patients were infected, and one-fifth said that the infection rate was higher than 20 percent. Three-quarters of the clinics reported that the incidence of STDs among their clients had increased during the past three years.⁹

In New York State, visits to family planning clinics for treatment of an STD have in-

creased almost 80 percent since 1984.¹⁰ At Planned Parenthood of Atlanta, repeat visits for treatment of an STD have jumped 30–40 percent in the last 4–5 years. As a result, says executive director Kay Scott, the agency no longer distributes medications; instead, it gives clients prescriptions that can be filled at a pharmacy. Otherwise, Scott explains, the cost to the agency would "far outweigh" what it spends on contraceptives.

Chlamydia, which can lead to PID and infertility, is now the nation's most common STD, and it presents one of the biggest problems for family planning clinics. Many providers say that at least 10–15 percent of their clients are infected. "We are overrun by chlamydia," reports Francine Stein, executive director of Planned Parenthood of Westchester and Rockland Counties, New York, which initiated routine chlamydia screening in 1989 at an annual cost of about \$100,000.

Without universal screening, chlamydia often goes undetected until it results in serious complications. In Colorado, for example, three-quarters of patients found to have chlamydia during a special screening program at family planning clinics funded by the health department were asymptomatic.¹¹ Likewise, a majority of the more than 10 percent of patients at Planned Parenthood of Southern Indiana who tested positive during a year-long universal screening program had no symptoms.¹²

Although chlamydia is the most common STD, family planning clinics are less likely to screen for it than for gonorrhea and syphilis. Virtually all clinics surveyed in 1990 by the SFPA reported that they test for gonorrhea, and 86 percent screen for syphilis, but only 66 percent do any chlamydia testing. Gonorrhea screening is a routine part of initial and annual visits at most family planning clinics, but only 26 percent of clinics routinely test for chlamydia during the initial clinic visit and only 19 percent do so as part of the annual visits.¹³

Costs of STD Testing

The only explanation for these seemingly illogical testing practices appears to be the availability of financial support: The federal Centers for Disease Control (CDC) has long provided funding through state health departments to screen for gonorrhea and syphilis, and states have made some of that support available to family planning providers. The CDC has provided relatively little support for chlamydia screening, however, and states have generally used any available resources for their own STD programs rather than pass them on to other providers.

"Chlamydia . . . has never gotten the attention and funding it deserves," notes Kath-

leen Toomey, CDC's associate deputy director of the Division of STD/HIV Prevention. "In part this is because AIDS eclipsed everything else, and then the reemergence of syphilis put [chlamydia] on the back burner."

As a result, agencies often have to use their family planning funds to screen for chlamydia—at a cost per test of \$5–\$13. Planned Parenthood of Chicago will spend nearly \$31,000 in 1991 to screen some 6,600 patients at its three Title X-funded clinics, where infection rates range from eight percent to 16 percent.*

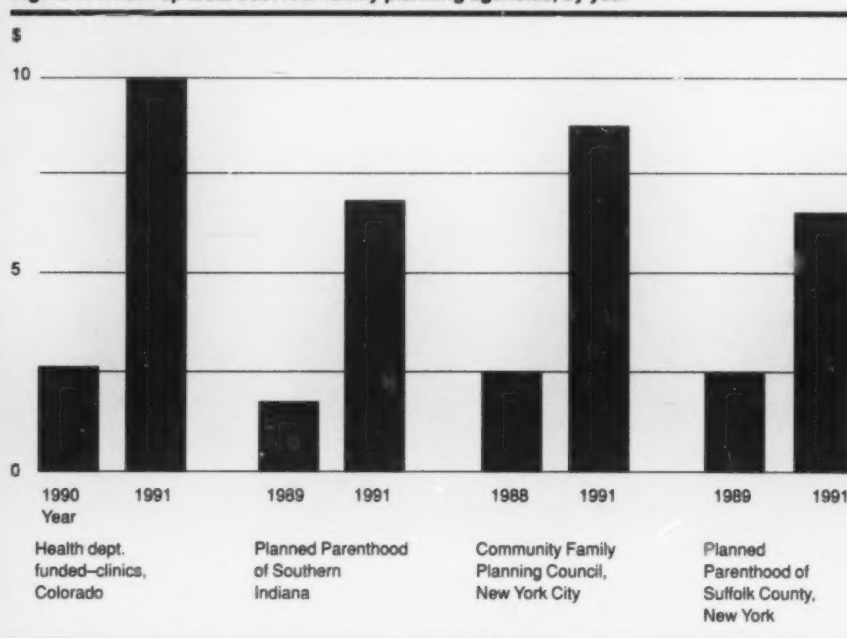
"There already were not enough Title X funds to serve our family planning patients, but we felt we had to bite the bullet and screen for chlamydia," says Madeline Levine, Chicago Planned Parenthood's director of client services. "It will eat away our family planning funds."

For that reason, clinics funded by the Colorado Health Department cannot undertake universal screening, says Henneberry. "I feel very strongly that it is important to do routine screening. [But] to do that we would have to take money out of contraceptive services."

More than seven in 10 family planning clinics report that they absorb at least some of the costs associated with STD screening.¹⁴ (Because clinics run by hospitals or health departments can often refer patients to STD clinics and cancer-screening programs within the same facility and have their lab tests read in-house, they have been shielded somewhat from some of the escalating costs.) Even those clinics that receive outside support (which often comes in the form of free test kits that can be sent back to the state laboratory for free analysis) have expenses related to staff time spent counseling the patient about the test and collecting and mailing the sample; postage alone costs \$1 or more per sample.

Some providers that cannot absorb these costs or that do not receive any outside support have opted to forego testing. Instead they treat presumptively patients who are symptomatic or, who because of age or behavior, are at increased risk of contracting an STD. However, even these clinics generally must absorb at least some of the costs of treatment,¹⁵ which are also rising rapidly. The cost of treating gonorrhea has risen dramatically, for example, as the disease has become resistant to penicillin. "It used to [cost] 50 cents to \$1 to treat gonorrhea; now it costs \$8–\$12," notes Mann.

*Title X of the Public Health Service Act is a federal program designed to provide funds for the provision of comprehensive family planning services, as well as related health services including Pap smears and other appropriate lab tests.

Figure 1. What Pap tests cost four family planning agencies, by year

Human papillomavirus (HPV), also known as genital warts, is an expensive condition to treat and presents a major problem for family planning clinics. "It is not like chlamydia, [for which] you give an antibiotic and send [the patient] home," says Jodi Tomlonovic, executive director of the Iowa Family Planning Council. "Warts require multiple [visits] for topical treatment . . . they place a great deal of pressure on staff time." The cost may explain why only about one-quarter of family planning clinics offer treatment for HPV, even though 90 percent screen for the disease through a Pap smear.¹⁶

Reinfection is a big problem in many clinics, because clients continue to have sexual relations with partners who have not been treated for infection. While providers have traditionally urged patients to notify their partners if the patients are infected with an STD, the providers have been less likely to offer testing and treatment for males.¹⁷ Some family planning clinics have initiated services for males as an efficient way to reduce the incidence of STDs among their female clients, but there are costs associated with these services, particularly the cost of training staff to work with male patients.

Clinics are also recommending that clients use two contraceptive methods—one (usually the pill) to prevent pregnancy and an-

other (the condom) to prevent disease. Some providers say, however, that they cannot afford to distribute two methods free.

HIV and AIDS

In most areas, HIV infection does not appear to impose nearly as great a burden on family planning clinics as do other STDs, because the incidence of infection is very low. The Family Planning Council of Southeastern Pennsylvania recently lost its health department grant for HIV testing, for example, because of the low incidence among clients of its delegate agencies.¹⁸ In addition, the federal government and the states generally provide funding for HIV testing.

Nonetheless, some agency directors believe that resources needed to address other pressing problems are being diverted to AIDS activities. Treatment of STDs "is suffering because resources are being siphoned to AIDS," claims Doris Barnett, director of Family Health Services in the Alabama Health Department.

Even in states where HIV rates are relatively high, family planning clinic directors are concerned about the emphasis on AIDS. The New York Department of Health "has made funding for family planning contingent on clinics offering HIV testing," reports Stein of Planned Parenthood of Westchester and Rockland Counties. She says the state's policy, which was adopted in 1987 has "markedly shifted the agenda and the emphasis of the [family planning] program away from pregnancy prevention . . . All [our] new visits,"

she adds, "are related to HIV. Our family planning caseload has not grown."

At a minimum, family planning clinics throughout the country give clients basic information about the disease and help them assess their risk, frequently through a self-administered questionnaire. Even this limited service puts added pressure on agency budgets, however. Fran Way, associate executive director of patient services services at Planned Parenthood of Wisconsin, estimates that it costs her agency about \$100,000 a year to provide basic AIDS prevention counseling. "Every new [activity] comes with a price and costs money," she notes.

The Rising Cost of Pap Smears

Until recently, the Pap smear, which can detect cervical cancer as well as premalignant changes in the cervix, was an inexpensive test, usually costing clinics no more than \$1-\$2.* According to studies in the mid-1980s, however, Pap tests were often incorrect: Some reports claimed false-negative rates were as high as 55 percent.¹⁹ The problem was attributed primarily to cytotechnologists' carelessness in reading slides; the technologists were frequently paid on a per-slide basis and worked for several labs in an effort to screen as many slides as possible.

In response to these reports, Congress passed the Clinical Laboratory Improvement Amendments²⁰ of 1988, which impose strict performance standards and proficiency requirements on virtually all laboratories in the country. Final regulations implementing the law have not been issued, but proposed rules permit cytotechnologists to analyze no more than 80 slides in a 24-hour period.²¹

Even before the proposed regulations were issued in May 1990, however, laboratories began raising their fees in anticipation of having to hire additional cytotechnologists. Moreover, technologists, who are in short supply, began demanding higher salaries—reportedly as high as \$50,000 in some areas²²—to compensate for the limit on the number of slides they are allowed to read.

While the price increases vary among providers, most have already seen their costs at least double, and as Figure 1 indicates, some agencies have experienced even bigger increases. Because clinics take thousands of Pap smears every year, the additional cost adds up quickly. In Colorado, for example, the 25 agencies funded through the state health department will pay \$200,000-\$300,000 more for Pap tests in 1991 than they did in 1990.²³ At the Community Family Planning Council in New York City, the cost of performing 18,000 Pap tests a year is \$120,000 more than three years ago as a result of the \$6.50 rise in the lab charge.²⁴

*Clinics have different arrangements for their laboratory work. Some use commercial labs, others use their states' laboratories and some use both. A few large family planning providers have their own labs.

Even a relatively modest increase can have a major impact. The price of Pap tests negotiated by the Iowa Family Planning Council for its 10 delegate agencies rose \$2.30 between 1990 and 1991. The increase means that the 40,000–45,000 Pap tests performed annually by the member agencies will cost, at a minimum, an additional \$92,000. "That ... equals 10 percent of our ... Title X grant," reports executive director Tomlonovic.

Family planning clinics are also frequently encountering long waits for test results, because cytotechnologists are reading fewer slides. Planned Parenthood of Wisconsin waits 6–8 weeks for the results, which a few years ago were available in 1–2 weeks.²⁵ In Pennsylvania, the delay can be up to 10 weeks,²⁶ and in New York, up to 12 weeks.²⁷

Long delays "increase the chance of not being able to contact a patient" whose test is abnormal, points out Way of Planned Parenthood of Wisconsin. The effort to find patients and arrange follow-up care takes "hours and hours [and] ties up staff who [then] can't see new family planning patients," adds Henneberry, of the Colorado Health Department.

An additional problem is that the number of patients who have abnormal Pap smears and therefore require additional testing and follow-up is rapidly increasing. In New York State, for example, the number of abnormal Pap tests increased an average of 53 percent between 1989 and 1990 among patients at 37 family planning agencies.²⁸ Henneberry estimates that in Colorado, about 25 percent of patients in clinics funded by the health department have Pap smear results that require additional testing. "I long for the day when we only did one Pap test for each patient in a year," she says. "On some patients, we do as many as 3 or 4."

Providers report that HPV, which is associated with several types of cancer, is the most common cause of an abnormal Pap test. Protocols vary among agencies, but many family planning clinics recommend that patients who have HPV or a repeat Pap test that is abnormal undergo colposcopy, a procedure that allows the clinician to examine the cervix under a microscope and biopsy the area where dysplasia has occurred.

Colposcopy costs between \$100 and \$300. Arranging referrals is becoming increasingly difficult, providers report, because fewer and fewer private physicians will accept Medicaid patients or uninsured women who cannot pay the full fee at the time of the service. As a result, poor women "don't get colposcopies [and] the problem goes unchecked," states Dana Frazee, executive director of Planned Parenthood of West Texas.

In response to the growing need among

Table 1. Percentage distribution of funding sources for family planning services at Family Planning Council of Western Massachusetts, 1981 and 1991

Source	1981	1991
Title X	48	23
Social Services		
block grant	26	13
Fees	10	38
Medicaid	5	10
Other	11	16
Total	100	100

their patients and the difficulties in arranging referrals, family planning agencies are increasingly initiating their own colposcopy services. Between 1989 and 1990, for example, on-site colposcopies increased 146 percent at a group of family planning agencies in New York.²⁹

Providing colposcopies for uninsured women is an expensive undertaking, however. Agencies associated with the Family Planning Council of Southeastern Pennsylvania will spend about \$20,000 in 1991—compared with \$5,000–\$7,000 in 1986—to provide colposcopies for uninsured clients.³⁰ Generally, providers do not use their Title X funds to pay for the procedures; instead, they rely on Medicaid for eligible clients and charge others on a sliding scale. Some agencies have received special state grants to subsidize services for their poorest clients. Planned Parenthood of Wisconsin, for example, received a cancer prevention grant from the state that covered some of its costs in 1990; even so, about half of the 800 colposcopies it performed were not reimbursed.³¹

Contraceptive Price Increases

Family planning providers are confronting a new crisis precipitated inadvertently by Congress when it enacted legislation in 1990 designed to curb Medicaid costs. The legislation required drug companies to give state Medicaid programs price reductions for bulk purchases of prescription drugs just as pharmaceutical companies have long done for other large health care providers.³² The drug companies have responded by charging significantly higher prices to all their bulk purchasers when purchase agreements expire.

In past years, family planning providers have been able to negotiate very favorable prices for birth control pills and for medications used to treat STDs and vaginal infections. Those providers have, in turn, used the profit generated from the sale of these products to paying clients to subsidize services for those who cannot afford to pay. Now, however, prices are beginning to rise steeply. Under a new agreement with Ortho Phar-

maceutical, for example, the Colorado Health Department will have to pay 40 percent more per cycle (70 cents, compared with the old price of 50 cents) for its most popular oral contraceptive. In addition, the prices of common treatments for vaginal infections have at least doubled.³³ Henneberry estimates that it will cost her program an extra \$100,000 in 1991 to purchase oral contraceptives and other medications at these higher prices.

The Mississippi Health Department is facing even greater price increases. Largely as a result of a tripling of the price of its most prescribed birth control pill, it expects to pay about \$242,000 more for pharmaceuticals this year, out of an operating budget of about \$3 million.³⁴ Neither program will be able to pass on these extra costs, the program directors say, because their patients are too poor to pay the contraceptive costs themselves.

Another consequence of the 1990 legislation is the refusal of Wyeth Laboratories to negotiate any discount with family planning providers for the purchase of NORPLANT®, for which they are charging \$350. Doctor fees for insertion and removal are extra. Without a discount, the price will be prohibitive for most clinic patients; only those eligible for Medicaid in states that have agreed to pay for the method will be able to obtain it.

Inadequate Funding

Providers believe that policymakers, especially at the federal level, do not appreciate the severity of the crisis they face as a result of escalating costs for basic services and the deteriorating health status of their clients. Of special concern is the failure of Title X—the only federal program designed specifically to subsidize family planning services for the poor—to keep pace with the growing pressures on agency budgets. In fact, the funding level has declined significantly: In 1990, Title X funding for contraceptive services was some \$42 million below the 1980 funding level; with inflation taken into account, that is nearly a 66 percent decrease over the last decade.³⁵

Clinic budgets reflect the precipitous drop. As Table 1 shows, Title X accounted for 48 percent of the family planning budget at the Family Planning Council of Western Massachusetts in 1981, but only 23 percent in 1991.³⁶ Other agencies have experienced a similar decline in Title X's share of their budgets. In New York State, family planning clinics lost an estimated \$13 million in Title X funds between 1980 and 1988 as a result of cuts and inflation.³⁷

Despite the decline, clinics that accept Title X funds are still required to provide free services to all clients whose incomes are below the federal poverty level. As the clients'

health needs have increased, so have the costs of treating them—so steeply, in fact, that some agencies do not use Title X funds at some of their clinic sites, so that they can charge fees to all patients, including those who would qualify for free services in Title X-funded clinics. "I can't afford to make new clinics Title X [clinics]," declares Frazee, of Planned Parenthood of West Texas.

As Title X funding has declined, Medicaid has become the single largest source of support for family planning services nationwide.³⁸ However, restrictions on eligibility limit the number of women who are covered, and the rates Medicaid pays for most services do not cover the providers' costs.* In Alabama, for example, only 18 percent of the health department's 101,000 family planning patients are eligible for Medicaid coverage, even though the vast majority have incomes below 150 percent of poverty.³⁹ In California, fewer than 10 percent of patients at the 200 clinics throughout the state that are funded through the Los Angeles Regional Family Planning Council qualify for Medi-Cal, even though 76 percent have incomes below the poverty level.⁴⁰ "Few qualify, because they have no kids . . . are undocumented aliens or for some other reason," explains executive director Thomas Krings.

Many agency directors say that despite increased support from Medicaid and, in some states, from the Maternal and Child Health and Social Services block-grant programs, they do not have the resources to meet the need in their communities. "I can't afford to provide services to the patient load [we] have now," declares Mann, of the Family Planning Council of Southeastern Pennsylvania.

To compensate for inadequate public support, many family planning providers outside of hospitals and health departments are increasingly relying on patient fees. (Hospital-based and health department programs can rarely raise more than 1–2 percent of their revenue through fees.) At the Family Planning Council of Western Massachusetts, for example, fees are expected to generate nearly 40 percent of the agency's revenue this year—up from 10 percent in 1981 (see Table 1).⁴¹ Similarly, at Planned Parenthood of Wisconsin fees now account for half the agency's total budget, compared with 13 per-

cent in 1980—and two-thirds of its budget for direct patient services.⁴²

Some agency directors are concerned that their greater reliance on fees makes family planning services less accessible to poor women, but others maintain that fees enable them to subsidize services for their poorest clients. Fees "are the only place to turn when there are no more federal funds and you've reached the limits of private fundraising," asserts Way of Wisconsin Planned Parenthood. They allow the agency "to funnel scarce Title X funds . . . to areas with the highest percentages of low-income clients."

But, Way adds, there is a limit to how high fees can go, and "we are close to reaching our limit. Low-income clients can't afford [fees]. Others who find [we] offer high-quality services come for them; [but] they won't if we charge high fees. Then we can't subsidize [services] for low-income clients."

Negative Consequences

The federal government has dismantled its system of collecting data on the number of federally subsidized family planning clinics and patients, so there is no way to know whether the number of subsidized clinics has declined in the wake of rising costs and inadequate public support. But many providers say that as a result of insufficient funding, their patient population has increased slowly or not at all in recent years. "The growth of our program slowed dramatically after 1980," reports Mann, who notes that the number of patients served through the Family Planning Council of Southeastern Pennsylvania rose by less than two percent a year between 1981 and 1991.

Providers throughout the country report that new clients often have to wait as long as 5–6 weeks for an appointment, when a few years ago they could be seen within two weeks. "A month . . . is a long time to wait for someone who wants birth control or thinks they're pregnant," observes Sandy Anderson, executive director of Planned Parenthood of Southern Indiana.

Some clinics have actually experienced a decline in the number of patients. In some instances, the decline has been slight; in others, it has been dramatic. In Los Angeles, for example, the number of patients served by the 23 agencies funded through the Los Angeles Regional Family Planning Council dropped from 170,000 in 1981 to 140,000 in 1990.⁴³ In Louisiana, the health department served 27,000 fewer patients in 1990 than in 1980.⁴⁴ In part, these declines may reflect cutbacks in outreach activities. "We don't knock on people's doors any more," says Joan Smith, director of the family planning program in the Louisiana Health Department.

Especially disturbing are indications that

family planning clinics are serving fewer women who are most in need of subsidized services. According to a recent survey by Family Planning Advocates of New York State, Inc., a group of 24 clinics in New York served 16 percent (almost 18,000) fewer persons with incomes at or below the poverty level in 1988 than in 1986. During the same period, the number of patients with incomes between 100 percent and 150 percent of poverty declined more than 10 percent, and the number of adolescent patients under age 18 dropped by about 30 percent.⁴⁵

Providers are also worried that the lack of adequate funding is forcing them to adopt a "bare-bones" approach to service delivery. "I worry about low-income women and teens who need more time than we have to give patients with special needs," comments Way.

Jane Boggess, who heads the family planning program for the Health Department in San Bernardino County, California, says her agency uses lower paid staff members to provide as many services as possible; that means a patient may see 3–4 different people in the course of a visit. While this approach saves money, "it undoubtedly has resulted in poorer quality care," she says.

Conclusion

Family planning clinics clearly have an important role to play in the detection, control and treatment of STDs and other serious medical conditions affecting women. However, without significantly increased funding, they cannot fulfill that role and still continue to meet their primary responsibility of providing contraceptive services to low-income individuals.

Even if Title X funding is increased and Medicaid eligibility is expanded, family planning clinics are still likely to need additional support from the federal government and the states to help them cope with soaring costs associated with STD testing, Pap smears and follow-up of patients.

The CDC, which spends considerably less for chlamydia testing than for gonorrhea, syphilis and HIV screening, is beginning to recognize the benefits of including family planning clinics in its prevention activities. It is currently helping to fund a special project in four western states—Washington, Oregon, Idaho and Alaska—that provides chlamydia testing in a total of 166 family planning clinics. During the project's first three years, the incidence of infection in the four states has declined almost 30 percent, from 11 percent to eight percent.⁴⁶

The CDC has also distributed to the states and several major cities \$5 million earmarked by Congress in 1989 for chlamydia testing, with the suggestion that states use the funds

*In most cases, Medicaid eligibility is based on eligibility for welfare; eligibility is related to family composition (a woman usually does not qualify unless she is pregnant or has a child) and to family income (in 24 states, the income cut-off is below 50 percent of poverty—see: National Governors' Association, "MCH Update: State Coverage of Pregnant Women and Children," Washington, D. C., July 1990, table 2). As a result of these limitations, most family planning patients do not qualify for Medicaid.

to support testing in family planning clinics, community health centers and other types of facilities, as well as in their own STD clinics. Nevertheless, a CDC official acknowledges that, given the scope of the problem, \$5 million is a "piddling amount."⁴⁷

Some states have provided funds for chlamydia testing in family planning clinics, and more states would probably do so if the need were clearly documented. In Iowa, the Family Planning Council used the results of a brief, universal screening program funded by Abbott Laboratories to show the state legislature that 10 percent of patients at its delegate agencies had chlamydia. "It really helped to have that information," reports Tomlonovic, noting that the legislature appropriated \$50,000 for chlamydia testing in 1989 and \$150,000 in 1990.

Some states have also provided funding to family planning clinics to pay for colposcopies, and at least one agency—the Family Planning Council of Southeastern Pennsylvania—has a special grant from its regional Title X office to pay for colposcopies for uninsured women.⁴⁸ Other providers have negotiated agreements with their state lab⁴⁹ or a local hospital⁵⁰ to read Pap tests at no charge or at a reduced rate.

Federal support for these services may soon become available through the Breast and Cervical Cancer Mortality Prevention Act of 1990,⁵¹ under which \$13 million was appropriated for FY 1991 and additional funding will be following in FY 1992 and 1993 for screening and referral for these diseases. Funds under this program will go through the cancer prevention program in state health departments. "It's really important that family planning agencies have some connection with the cancer control program," advises Henneberry, since the staffs of these programs may not be used to dealing with direct service providers and may not automatically think of family planning clinics as a logical provider of these services.

Family planning clinics are a logical provider of cancer prevention services, STD testing and treatment, and testing and follow-up for cervical abnormalities because they serve millions of reproductive-age women at risk of these diseases and conditions, many of whom do not have access to other sources of health care. Without additional funding, however, clinics may have no option but to cut back on their services.

As the State Family Planning Administrators warned recently, "the mission, mandate and funding for Title X programs [are] to provide contraceptive services, not STD services. . . . Title X family planning clinics

cannot continue to absorb the cost of staff time, testing, treatment, follow-up and education needed to manage and control [the STD] crisis." If additional funding is not forthcoming, they concluded, "current STD/HIV services [in family planning clinics] may be in serious jeopardy."⁵²

The most immediate need, however, is for Congress to take steps to shield family planning agencies from major increases in drug costs that are precipitated by the 1990 legislation requiring a reduction in drug prices for Medicaid agencies. If the prices of contraceptives are not rolled back, providers fear that, in the words of one agency director, "this problem will surely be the straw that breaks the back of the family planning system."⁵³

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Public Funding of Contraceptive, Sterilization And Abortion Services, Fiscal Year 1990

By Rachel Benson Gold and Daniel Daley

Summary

In FY 1990, the federal and state governments spent \$504 million to provide contraceptive services and supplies, according to results of a survey of state health, social services and Medicaid agencies conducted by The Alan Guttmacher Institute. Medicaid accounted for 38 percent of all public funds spent on contraceptive services, Title X provided 22 percent, and two federal block-grant programs—Social Services and Maternal and Child Health—together were responsible for 12 percent of public expenditures. State governments accounted for the remaining 28 percent of public funding.

Although public expenditures for contraceptive services have risen by \$154 million over the past decade, when inflation is taken into account, expenditures have actually fallen by one-third. Since 1980, the proportion of public contraceptive expenditures contributed by Title X has been cut virtually in half, while the proportion contributed by state governments has nearly doubled. When inflation is taken into account, Title X expenditures for contraceptive services have fallen by almost two-thirds since 1980.

The federal and state governments together spent \$95 million to subsidize sterilization services in 1990, and \$65 million to provide abortion services. The federal government was the major source of funding for sterilization services but provided less than one percent of the cost of abortion services.

Because of changes over time in survey methodology and the difficulties some states had in separating out expenditures by type of care, these data are approximations.

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States appear to be attempting to offset some of the diminishing federal funds with their own. In 1980, only 25 states and the District of Columbia used their own funds for family planning services; in 1990, 44 states and the District did so.

Introduction

Federal funding for contraceptive services and supplies is available through four primary sources: Title X of the Public Health Service Act, and the Maternal and Child Health (MCH) block grant, Medicaid, and the Social Services block grant (Titles V, XIX and XX of the Social Security Act, respectively).

Title X is a categorical grant program in that the funds are targeted to a specific purpose (and are given either to state agencies or private nonprofit agencies), as opposed to block-grant funds, which can be designated for a wider array of uses (and are given to state agencies only). It is the only federal program devoted solely to providing family planning services. The Department of Health and Human Services (DHHS) awards Title X grants directly to providers, which can include health departments, family planning councils, hospitals and other public and private nonprofit agencies. While the range of services can vary among clinics, the core services consist of contraceptive information; contraceptive services (including natural family planning); gynecological examinations (including basic lab tests and other screening services for high blood pressure and breast and cervical cancer); sexually transmitted disease (STD) detection; pregnancy testing; and infertility services.

Unlike the Title X funds, the MCH and Social Services block-grant funds are distributed only to state health and social services agencies, respectively. The federal government requires that the states match every four federal MCH dollars with three of their own dollars; the Social Services block grant has no matching requirement. Contraceptive services are among a federally

specified array of services that states may provide with their block-grant allotments; states determine which services they provide and what portion, if any, of their block-grant funds will be spent on such services. State agencies may provide services directly or make arrangements with other agencies to provide them.

Medicaid, a joint federal-state program that provides necessary health services to the very poor, is the fourth major source of contraceptive services funding. Unlike the other federal funding sources, Medicaid is an entitlement program, which means that spending is determined by the number of people eligible to receive Medicaid-funded health care and the cost of the care received, rather than by a direct congressional appropriation. All states and the District of Columbia participate in the program; they must provide a package of mandated medical services, which includes family planning services and supplies.

Medicaid eligibility is generally linked to welfare eligibility. In 1986, however, Congress began to break the link between welfare and Medicaid, at least for pregnant women and their children. Since then, pregnant women who do not meet the income and family structure criteria for cash assistance have been eligible for Medicaid as long as they meet certain income criteria. States are now required to provide Medicaid coverage to pregnant women (and their children up to age six) with incomes up to 133 percent of the federal poverty level; pregnant women (and their infants up to age one) with incomes up to 185 percent of poverty may be covered at the states' discretion. Women who are newly eligible under these expansions may receive Medicaid-funded family planning through

their 60-day postpartum period only; their Medicaid eligibility then ends unless they qualify for reasons other than pregnancy.¹ Nonetheless, these expansions should increase the number of women eligible to receive Medicaid-funded family planning, if only during the postpartum period.

The federal government reimburses states for a portion of their Medicaid expenditures based on a reimbursement rate set by the DHHS, which assigns each state a "regular" reimbursement rate of 50 to 80 percent of the cost of providing care. Family planning services (which may include sterilization and infertility services as well as contraceptive services and supplies) are the only medical services eligible for a special reimbursement rate of 90 percent of each state dollar spent. However, the DHHS has never issued a formal definition of eligibility for the special 90 percent rate, so the services for which this special rate is claimed may vary from state to state.*

Besides the four federal funding sources, virtually all states use some of their own resources to fund contraceptive services. State funds include special appropriations made by legislatures, general assistance programs and general revenues allocated to state social services or health agencies. Some states use the administrative apparatus from their Medicaid programs to provide medical services—including contraceptive services—to people who do not meet the criteria for federal Medicaid reimbursement. In these cases, services are funded entirely with state dollars.

The federal government is the major source of public funding for contraceptive sterilization services, the leading contraceptive method among married women in the United States.² Although most federal expenditures for sterilization are through the Medicaid program, some are also made through Title X and the Social Services and MCH block grants. Since 1979, strict regulations have limited DHHS funding of sterilizations. For example, the informed consent procedure, which is detailed and complex, mandates a 30-day waiting period between the time a woman gives her consent and the date of her sterilization. These regulations have also prohibited the sterilization of anyone who is under age 21 or mentally incompetent.³ Although the federal government funds most of the publicly funded sterilizations, some procedures are financed with state funds when the federal requirements are not met.

The implementation in 1977 of the Hyde Amendment—a congressional restriction on the use of DHHS funds for abortions—has nearly eliminated any federal role in subsidizing abortion services for low-income

women. Since 1981, federal funds have been available for abortions only when a pregnant woman's life would be endangered if she carried the pregnancy to term. Supporters of abortion rights have been unsuccessful so far in their attempts to expand this exception to include cases of rape and incest. In the past two years, Congress has passed legislation broadening the standard for federal funding of abortions, but these bills have been consistently vetoed by President Bush. As a result, almost the entire responsibility for providing public funds for abortion now rests with individual states.

Methodology

For nearly two decades, The Alan Guttmacher Institute (AGI) has conducted periodic surveys of state health, social services and Medicaid agencies to determine the amount of federal and state funds spent for contraceptive, sterilization, infertility and abortion services. The most recent study was for FY 1987.⁴

In January 1991, state health, social services and Medicaid agencies were sent questionnaires about expenditures for FY 1990 (October 1, 1989, to September 30, 1990). Forty-seven states and the District of Columbia responded to the social services and Medicaid surveys; Idaho, Rhode Island and Massachusetts failed to respond to the Medicaid survey, while Idaho, Rhode Island and Utah failed to respond to the social services agency survey. The District of Columbia and all states except Idaho responded to the health agency survey.

The states were asked to provide the amount and source of funding (Title X, Medicaid, the MCH block grant, the Social Services block grant and state funds) for a range of patient care services as well as for outreach and education activities. The patient care services include those for contraception, sterilization (which was considered separately because of the special federal regulations and reporting requirements), abortion, and related medical care.

Contraceptive services as defined in the survey questionnaire include "consultation (including counseling and patient education), examination and treatment furnished by or under the supervision of a clinician or prescribed by a clinician; laboratory examination (including Pap smears, routine STD testing in conjunction with a family planning visit, pregnancy testing, etc.); and medically approved methods (including natural family planning), procedures (such as insertion of IUDs but excluding sterilization), pharmaceutical supplies and devices to prevent conception."

Related medical care includes "any pa-

tient care services—such as STD or HIV services (testing, extended counseling, treatment or referral, follow-up, etc.)—beyond those services routinely provided in conjunction with a family planning visit." Respondents were asked to provide only Title X expenditures for patient care services related to reproductive health. Respondents were also asked to provide expenditures on activities related to the provision of information and education such as outreach campaigns, development of educational materials and special initiatives.

In addition to reporting expenditures for contraceptive services in actual 1990 dollars, this article reports data in constant 1980 dollars, based on increases in the Medical Care Price Index from 1980 to 1990. This framework permits an examination of contraceptive funding trends over time, while taking inflation into account.

The methodology used in the 1990 survey differs from that used in past surveys in two key aspects of the Title X data. The first difference is in the kinds of agencies surveyed. In past studies, we derived total Title X allocations for each state from a list of Title X grantees provided by the DHHS Office of Population Affairs. We then surveyed only Title X grantees that were state health agencies to determine how much of their grant award was spent on contraceptive services and supplies, sterilization and infertility services. However, since we had surveyed state health agencies only, we had no comparable breakdown for other grantees whose entire Title X services awards were therefore designated as an expenditure for contraceptive services and supplies.

The 1990 study, however, included a separate survey of Title X grantees other than state health agencies in order to allow greater precision in isolating Title X expenditures for contraceptive services and supplies. Of the 77 Title X grantees, 37 are state health agencies and 40 are other agencies such as family planning councils and Planned Parenthood affil-

*In a recent memorandum to its regional administrators, the Health Care Financing Administration (HCFA) described those services eligible for the special 90 percent reimbursement rate. According to the memorandum, "Family planning services are those provided to prevent or delay pregnancy or to otherwise control family size. Counseling services, laboratory tests, medical procedures and pharmaceutical supplies and devices are covered if provided for family planning purposes." However, the memorandum stipulates that "states have some flexibility in determining the 'specific services or supplies' to be covered... based on overall state policy, legislation and practices..." (See: Memorandum to the Regional Administrators from the Director, Medicaid Bureau, HCFA, "Financial Management Review Guide for Family Planning Services—ACTION," Washington, D.C., Dec. 13, 1990.)

iates. All 77 grantees responded to the survey.

The second difference is that the scope of the information on Title X expenditures in the current survey is wider than that of past surveys. Prior to 1990, state agencies were asked only about expenditures of Title X funds for contraceptive, sterilization and infertility services. Since anecdotal information indicates that an increasing amount of Title X funds supports activities beyond these services, we asked grantees to report the amount of Title X funds spent on STD, HIV and other services in addition to those routinely provided in conjunction with a family planning visit. The combination of surveying all Title X grantees directly and asking about a wider range of expenditures under the program offers a more precise picture of the amount of Title X funds used to support contraceptive services, rather than other services funded through the program.

Although improved, the methodology used in the 1990 AGI study is still far from perfect, for two main reasons. First, not all grantees, including both state agencies and nonstate grantees, were able to separate expenditures for other medical and related services and expenditures for contraceptive services. Second, although all grantees incur some administrative costs, not all grantees were able to isolate them from other expenditures. As a result, the expenditures reported here as contraceptive services still include some administrative expenses and some patient care expenditures for services other than contraceptive services. Nonetheless, to the extent that some grantees could isolate these expenditures, the data reported here present a more accurate picture of public spending on contraceptive services than had previously been available. The data also give the first indication of the extent to which Title X funds are used for other services.

While yielding a more precise accounting, the change in methodology used in the 1990 survey produces a problem in comparability with previous AGI surveys. By subtracting some expenditures that had been reported as contraceptive services in prior surveys, we have, in effect, overstated the decrease in contraceptive funding under Title X.

Moreover, the Title X data supplied by grantees often differed from data appearing on the grant list obtained from the DHHS. Several grantees said they reported data for a different fiscal year, had received special

initiative funds during the course of the year, or had spent funds carried over from the previous year. Although this study attempted to determine the reasons why the data reported by grantees differed from the grant list, only the data submitted by individual grantees were used.

The problem of isolating expenditures for contraceptive services from other activities is not unique to Title X; it has been a longstanding problem for Medicaid as well. While most states could indicate the Medicaid expenditures on sterilization and abortion services, few could isolate expenditures for infertility. To the extent that the states claimed reimbursement for such services at the special 90 percent reimbursement rate, these expenditures were almost always included in the amount reported for contraceptive services. As a result, Medicaid expenditures for contraceptive services are overstated.

A last methodological problem arose because federal, state and local funds cannot always be completely separated. The MCH block grant requires states to match part of the federal expenditures, and Medicaid is funded jointly by the states and the federal government. In addition, many states match federal Social Services block-grant outlays, even though the federal government does not require them to do so. As in past AGI surveys, the federal expenditures presented include these state monies with the federal funds. State expenditures made independently and not necessarily to meet a federal requirement have been counted separately. (We also included as state expenditures those funds reported to have been contributed by local or county governments.) These procedures effectively overestimate the federal contribution and underestimate the state contribution.

Although the data presented here provide the most complete summary available of funding for contraceptive, sterilization and abortion services, the methodological issues require that the data be viewed as approximations of general trends rather than as a precise accounting.

Contraceptive Services

Together, the federal and state governments spent nearly \$504 million for contraceptive services in 1990 (Table 1). Federal funds accounted for \$364 million, or 72 percent of total expenditures, while states spent \$140 million, or 28 percent of total public expenditures.

Medicaid, the largest single source of federal or state funds for contraceptive services, accounted for 38 percent of the total expenditure, or \$190 million. State coffers were the second largest funding source. Title X, the third largest source of public funds for

contraceptive services, accounted for \$112 million, or 22 percent of the total amount spent. The Social Services block grant provided \$34 million, or seven percent of the total public expenditure, while the MCH block grant provided \$27 million, or five percent of all funds.

In responding to the survey, all 47 states and the District of Columbia reported Medicaid expenditures and claimed federal reimbursement at the special 90 percent reimbursement rate. While most states and the District of Columbia were able to isolate Medicaid expenditures for contraceptive services from those for sterilization, six, including California, could not. Therefore, sterilization expenditures for these six states are included in the amount reported for contraceptive services.* Further, in most states, the reported Medicaid expenditures include the amount spent for infertility. Seven states reported Medicaid expenditures for contraceptive services of less than \$500,000, while four states spent more than \$10 million each.

State Medicaid agencies were asked whether they paid a single, statewide rate to clinics to cover a patient's initial family planning visit. Of the 24 states and the District of Columbia that did so, nine states and the District of Columbia included drugs and supplies in the rate, while 15 states did not. The states' rates that included drugs averaged \$63 per visit, within a range of \$30-125; the rate without drugs averaged \$41 per visit, within a range of \$20-91.

All states and the District of Columbia reported spending some Title X funds for contraceptive services, with amounts ranging from \$279,000 in Wyoming to nearly \$11 million in California. However, these expenditures include sterilization costs in nine states, outreach and education costs in 13 states and the District of Columbia, and some administrative costs for about half the grantees.

Twenty-two states reported using some of their Social Services block grant for contraceptive services, although only 15 of the 22 were able to provide specific expenditures. For six of these, expenditures through the Social Services block grant represented more than 20 percent of the total public outlays for contraceptive services in that state.

Thirty-four states and the District of Columbia funded contraceptive services through the MCH block grants, together spending more than \$27 million. Expenditures through the MCH block grant constituted less than 20 percent of the total spent in all but four states and the District of Columbia. Other federal expenditures in Montana and West Virginia were channeled through the Preventive Health Services block grant (\$215,000 for both states combined).

*For five additional states—Maryland, Ohio, Oklahoma, Pennsylvania and Wyoming—the amount spent on sterilization was calculated based on the total amount these states claimed at the special 90 percent rate multiplied by the percentage of total Medicaid contraceptive services expenditures they attributed to sterilization in 1987.

and through the Low Income Energy Assistance Program in North Carolina (\$672,000).

Forty-four states and the District of Columbia reported using some of their own funds for contraceptive services (in addition to any state funds required to match federal funds)—although three states were unable to provide expenditure data—and Idaho did not respond to the survey. Four states (California, Florida, New York and Virginia) spent more than \$10 million each, together accounting for 52 percent of the total state expenditures nationwide. Nineteen additional states reported spending more than \$1 million of their own funds on contraceptive services. Further, in 15 states (including all four of those spending over \$10 million), state funds accounted for more than one-third of all public funds spent on contraceptive services.

As expected, the states with the greatest need also tended to have the largest expenditures: Of the 10 states with the largest number of women at risk of an unintended pregnancy in 1987,⁵ eight* were also among the 10 with the greatest Title X expenditures for contraceptive services and supplies; six† were among the 10 reporting the most state funds spent on contraceptive services and supplies; and eight‡ were among the 10 with the highest total public expenditures on such services.

Trends in Expenditures

Total public expenditures for contraceptive services rose from \$412 million in 1987 to \$504 million in 1990. When the data are adjusted for inflation, however, expenditures fell by two percent. Medicaid expenditures and state funding soared over the three-year period, while Title X funding dropped dramatically.

Medicaid funding increased in 32 states and more than doubled in 10; only 15 states and the District of Columbia reported a decrease between 1987 and 1990. In actual dollars, Medicaid spending for contraceptive services increased 38 percent over the three-year period, consistent with an overall nationwide increase of 44 percent in Medicaid expenditures since 1987.⁶ Even if the data are adjusted for inflation, Medicaid funding for contraceptive services rose 10 percent over the period.

This rise in Medicaid expenditures is probably attributable to a combination of factors.

*California, Florida, Georgia, Michigan, New York, Ohio, Pennsylvania and Texas.

†California, Florida, Georgia, Michigan, New York and Texas.

‡California, Florida, Georgia, Illinois, Michigan, New York, Ohio and Texas.

Table 1. Reported public expenditures for contraceptive services (in 000s of dollars), by funding source, according to state, FY 1990

State	Total	Federal sources						State* sources
		Total	Medicaid	Title X	Social Services block grant	MCH block grant	Other federal	
U.S. total	503,847	364,093	189,973	111,831	34,286	27,117	886	139,754
Ala.	9,414	5,854	2,341	3,012	0	500	0	3,561
Alaska	525	496	73	293†,‡	0	129	0	29
Ariz.	14,787	13,512	10,597§	1,983	200	732	0	1,275§
Ark.	4,764	2,330	225	1,649	0	456	0	2,434
Calif.	47,084	26,059	15,285§	10,774‡	0	0	0	21,026
Colo.	4,034	3,119	1,986	1,133	0	0	0	915
Conn.	4,957	4,467	2,019	1,174‡	1,242	32	0	491
Del.	982	722	214	508	0	0	0	260
D.C.	2,776	2,732	510	322‡	0	1,899	0	44
Fla.	31,520	11,273	7,138§	3,550	0	585	0	20,247
Ga.	28,376	23,759	19,619	4,140	0	0	0	4,617
Hawaii	2,161	1,079	412	591	u	76	0	1,083
Idaho	671	671	nr	671§,‡, **	nr	nr	nr	nr
Ill.	15,217	14,295	7,489	3,427	2,568	811	0	923
Ind.	5,065	5,065	2,182	2,883§,‡, **	0	0	0	0
Iowa	4,029	3,707	1,961	1,595‡	151	0	0	322
Kans.	4,702	3,094	1,862	1,232§,‡	0	0	0	1,608
Ky.	10,195	6,020	2,687	2,751	0	582	0	4,175
La.	11,418	10,458	6,923	2,161	0	1,374	0	960
Maine	5,114	3,398	2,453§	621	324	0	u	1,716
Md.	10,404	5,434	3,204††	2,229§	0	u	0	4,970†
Mass.	4,439	4,439	nr	2,486	1,762	191	0	u
Mich.	19,743	14,345	9,644	3,454§,†	0	1,247	0	5,398
Minn.	6,841	5,311	2,611	1,581	173	947	0	1,530
Miss.	6,235	5,999	2,131	2,363	1,505	0	0	236
Mo.	6,441	6,441	3,216	2,366§,‡	0	858	0	u
Mont.	1,617	1,569	519	819	0	29	202††	49
Nebr.	1,261	1,261	593	618‡	u	50	0	u
Nev.	1,524	1,524	734	791§,‡	0	0	0	0
N.H.	1,953	1,552	645	478‡	429	0	0	401
N.J.	12,460	10,560	4,060	4,013	1,912	575	0	1,900
N.M.	5,929	4,820	3,456	1,127	u	238	0	1,108
N.Y.	52,660	34,137	25,602	7,134†	0	1,400	0	18,523
N.C.	11,231	9,499	3,591	3,047	1,889	300	572§§	1,732
N. Dak.	771	771	322	330	0	119	0	0
Ohio	15,225	14,253	9,378††	4,199	u	676	0	972
Okl.	10,528	5,064	2,427††	2,012	u	625	0	5,464
Oreg.	4,215	4,105	1,773§	1,403§,‡	u	929	0	111
Pa.	12,183	12,183	1,238†,††	5,775	4,877	293	0	0
R.I.	535	320	nr	320	nr	0	0	215
S.C.	7,379	4,400	1,304	3,097	0	0	0	2,978
S. Dak.	841	820	206	289	0	325	0	21
Tenn.	15,498	14,748	7,916§	3,769†,‡	2,189	874	0	750
Tex.	40,117	32,348	5,873	5,124	14,931	6,420	0	7,769
Utah	1,409	1,409	827	455	nr	127	0	0
Vt.	1,474	1,240	677	430	134	0	0	233
Va.	20,320	7,468	3,110	2,601	0	1,757	0	12,852
Wash.	9,610	5,225	2,970	2,255	0	0	0	4,385
W. Va.	3,413	2,537	572	1,282	0	671	13††	875
Wis.	9,251	7,691	5,256	1,236§	u	1,200	0	1,560
Wyo.	547	510	140††	279	0	91	0	37

*Category also includes some local funds in several states.

†Includes some Maternal and Child Health block grant, state or local funds.

‡Includes some expenditures on outreach and education.

§Includes some expenditures for sterilization.

**Expenditures from the DHHS Office of Population Affairs grant list.

††Expenditure estimated based on the percentage distribution of 1987 expenditures.

‡‡Expenditures through the Preventive Health Services block grant.

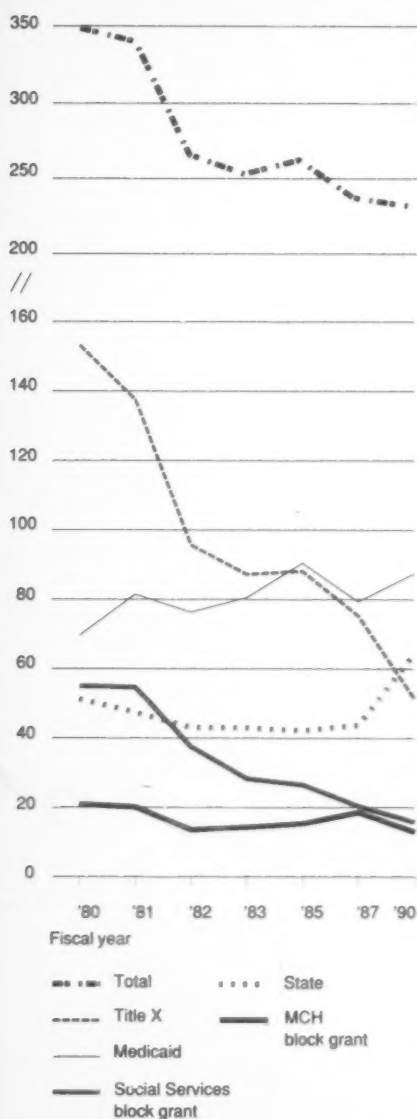
§§Expenditures through the Low Income Energy Assistance Program.

*†Incomplete data.

Note: Data for Medicaid and the MCH and Social Services block grants include state matching funds and the state share of joint federal-state Medicaid expenditures; in this and Tables 2 and 3, totals may not add due to rounding.

u=unavailable and nr=no response.

Figure 1. Reported public expenditures for contraceptive services (in 000s of constant 1980 dollars), by funding source, FY 1980-1990



Note: Data for 1980-1985 include expenditures for patient care and related activities; data for 1987 and 1990 include patient care expenditures only. All data are converted to constant 1980 dollars using the Medical Care Price Index.

First, some of the increase most likely corresponds to an increase in Medicaid recipients; nationwide, the number of recipients younger than 65 rose by eight percent from 1987 to 1990.⁷ While the recent expansions in Medicaid eligibility for pregnant women and infants may have increased the enrollment of more women of childbearing age, this is unlikely to have had a major effect on

the number of women receiving Medicaid-funded contraceptive care because many of them would be eligible to receive Medicaid-funded family planning only during the two-month postpartum period. Second, data from the AGI survey, although limited, indicate that the amount that state Medicaid programs reimburse family planning providers is rising: Twelve of the 25 states able to provide current reimbursement rates said that the rates had increased in the past two years. Third, increased automation of data systems may have improved the states' ability to identify expenditures that qualify for the special 90 percent reimbursement rate.

The increase in state expenditures for contraceptive services was especially dramatic over the three-year period, rising from \$76 million in 1987 to \$140 million in 1990. As with Medicaid expenditures, the increase was spread across most states. State funding increased in 35 states, including two (South Dakota and Arizona) that previously had spent no state money on contraceptive services. State expenditures decreased in only six states and the District of Columbia. Even with adjustment for inflation, state expenditures increased by 47 percent over the period.

Title X spending for contraceptive services between 1987 and 1990 decreased in 42 states and the District of Columbia. Only seven states reported an increase in Title X funding, while just one state, Indiana, had the same expenditure in 1990 as in 1987. When the expenditures are adjusted for inflation, Title X funding decreased by 32 percent over the three years.

Many factors probably contributed to this decline. First, some of the decrease is most likely the result of changes in the survey methodology. By subtracting some expenditures that had previously been included as contraceptive services—particularly some administrative, sterilization and outreach and education costs—the methodology overstates the decrease in Title X funds.

Second, the total amount of family planning grants given by the DHHS Office of Population Affairs decreased by five percent (in actual dollars) between 1987 and 1990; 60 of the 77 grant awards decreased over this period. Adjusted for inflation, total Title X services grants fell by 24 percent from 1987 to 1990. Monies channeled through the MCH and Social Services block grants also decreased between 1987 and 1990, by 30 percent and 22 percent, respectively, in constant dollars.

Figure 1 shows the 10-year trends for the various funding sources. Overall expenditures for contraceptive services over the past decade, calculated in constant 1980 dollars, dropped sharply in the early years of the

decade, but leveled off slightly toward the end of the period. Nonetheless, by 1990, total contraceptive services expenditures (\$232 million in 1980 dollars) were further away from their 1980 total of \$350 million⁸ than at any point over the decade.

While Medicaid expenditures edged upward throughout, state funding remained relatively stable until the last three years of the decade, when it increased dramatically. Title X, which was by far the greatest source of public support in 1980, now trails behind both state funding and Medicaid as a source of payment. Similarly, expenditures through the Social Services block grant dropped sharply over the course of the decade, while MCH block-grant funding remained relatively unchanged.

In constant 1980 dollars, total U.S. expenditures for contraceptive services fell by 34 percent between 1980 and 1990, despite an increase from 1982 through 1988 in the number of women at risk of an unintended pregnancy (from 34 million to 39 million).⁹ Two funding sources—Medicaid and state contributions—more than kept up with inflation, both increasing by 26 percent. Title X funding, however, fell by 66 percent over the decade.

Title X, the program over which the federal government has the most direct control, contributed 44 percent of total public funds for contraceptive services in 1980 but only 22 percent in 1990. As a result, the states appear to be attempting to offset some of the diminishing federal funds with their own: State funds accounted for 15 percent of total public expenditures on contraceptive services in 1980, but for 28 percent in 1990. This increase in the proportion of state funding has occurred in many states: In 1980, only 25 states and the District of Columbia used their own funds for family planning services; in 1990, 44 states and the District of Columbia did so.

Sterilization Services

The states and the federal government together spent \$95 million to provide contraceptive sterilization services in FY 1990 (see Table 2). Ninety-three percent of all public funds spent on sterilization—\$88 million—came from the federal government. The seven states spending more than three million federal dollars accounted for 54 percent of federal outlays for sterilization, with Texas alone representing 20 percent of total federal expenditures.

In 1990, Medicaid was by far the largest federal source of sterilization funds, accounting for 91 percent of federal funds and 84 percent of total public sterilization costs. Title X was the second largest federal source; 20 states reported spending a total of \$4.5 million in Title X funds, or five percent of all

federal monies spent on sterilization. (An additional 12 states reported some expenditures but could not provide data.)

Although New Hampshire, North Carolina and Texas were the only states to report having used Social Services block-grant funds for sterilization, together they spent \$2.7 million, representing the third largest source of federal funds for sterilization. Five states spent \$783,000 through the MCH block grant.

State funds in addition to those required to match federal expenditures represented only seven percent of all funds for contraceptive sterilization in 1990; 27 states and the District of Columbia used their own revenues for the procedure, although the District and nine states were unable to report precise data. Of these 27, five states—Arkansas, California, New York, Texas and Virginia—had the greatest expenditures, together representing 87 percent of all state sterilization funding. Arkansas, California and Texas each spent more than \$1 million in state funds.

Abortion Services

As a result of the Hyde Amendment, the number of federally funded abortions plummeted, from 294,600 in 1977 before the federal restrictions to 165 in 1990.¹⁰ Thus, the responsibility for providing most subsidized abortion services to low-income women has fallen to the states. Nineteen states reported spending a total of \$65 million of their own revenues to provide 162,418 abortions to indigent women in 1990 (see Table 3, page 210). (Three of these states could only provide incomplete data.) Almost all (99.9 percent) of these abortions were performed in the 13 states that continue to fund all or most medically necessary abortions for poor women; eight states adopted the funding policy voluntarily and five were ordered to do so by their state courts.

Only one of the 30 states and the District of Columbia that have a "life-only" policy similar to the federal government's reported state expenditures for abortion services; Arizona paid for two procedures. The remaining 199 state-funded abortions occurred

in five of the seven states* that have somewhat less restrictive policies than the federal "life-only" standard (Iowa, Minnesota, Pennsylvania, Virginia and Wisconsin).

Some abortion funding policies have been

in flux since the 1987 survey data were collected. For example, the funding standard of the District of Columbia changed abruptly on October 1, 1988, when Congress passed an amendment to the annual appropriations

Table 2. Reported public expenditures for sterilizations (in 000s of dollars), by funding source, according to state, FY 1990

State	Total	Federal sources				State sources
		Total	Medicaid	Title X	Other federal	
U.S. total	94,911	87,817	79,751	4,558	3,508	7,094
Ala.	2,809	2,714	2,614	100	0	95
Alaska	913	913	913	u	0	0
Ariz.	14	14	u	14	0	0
Ark.	1,923	627	598	29	0	1,296
Calif.	2,170	u	u	0	0	2,170
Colo.	1,349	1,279	1,269	11	0	70
Conn.	1,573	1,573	1,573	0	0	0
Del.	495	495	495	0	0	0
D.C.	694	694	694	0	u	u
Fla.	1,174	1,174	u	1,174	0	0
Ga.	144	99	65	34	u	45
Hawaii	532	488	488	0	0	44
Idaho	nr	nr	nr	u	nr	nr
Ill.	4,837	4,837	4,762	74	*,†	0
Ind.	3,299	3,299	3,299	u	0	u
Iowa	1,385	1,258	1,258	0	0	127
Kans.	781	781	781	u	0	u
Ky.	2,265	2,265	2,013	0	253†	0
La.	2,928	2,928	2,828	100	0	0
Maine	u	u	u	0	0	0
Md.	957	957	957‡	u	0	0
Mass.	u	u	nr	u	0	0
Mich.	2,942	2,942	2,941	1§	u	u
Minn.	615	529	529	u	u	86
Miss.	2,244	2,244	1,738	507	0	0
Mo.	799	799	799	u	0	u
Mont.	583	583	580	3	0	0
Nebr.	827	827	827	0	0	0
Nev.	202	202	202	u	0	0
N.H.	49	49	49	*	**	*
N.J.	2,336	2,241	2,241	0	0	94
N.M.	822	822	732	0	90†	0
N.Y.	6,971	6,498	6,498	0	0	473
N.C.	5,575	5,535	5,175	0	360**	40
N. Dak.	321	321	316	5	0	0
Ohio	5,841	5,841	5,748‡	93	u	u
Okla.	191	191	183‡	8	0	0
Oreg.	u	u	u	u	u	u
Pa.	1,714	1,714	1,710	4	0	0
R.I.	nr	nr	nr	0	0	0
S.C.	3,406	3,406	3,091	0	315†	0
S. Dak.	343	313	302	11	0	30
Tenn.	41	35	u	35††	u	6
Tex.	19,230	17,828	3,128	2,335	2,365**	11,402
Utah	359	359	359	0	0	0
Vt.	350	350	350	0	0	u
Va.	3,542	2,689	2,689	0	0	853
Wash.	2,217	2,069	2,069	u	0	148
W. Va.	511	396	251	20	125†	115
Wis.	1,612	1,612	1,612	u	0	0
Wyo.	1,023	1,023	1,023‡	0	u	u

*Indicates an expenditure of less than \$500.

†Maternal and Child Health block grant funds.

‡Expenditure estimate based on the percentage distribution of 1987 expenditures.

§Incomplete data.

**Social Services block grant funds.

††Includes both Social Services block grant and Maternal and Child Health block grant funds.

Note: Medicaid and other federal sources include state matching funds and the state share of joint federal-state Medicaid expenditures.

*Three of these states (Minnesota, Pennsylvania and Wyoming) have policies permitting payment for abortions in cases of life endangerment, rape or incest. Two (Iowa and Virginia) permit funding in cases of life endangerment, rape, incest or severe fetal defect. Colorado's policy allows funding in cases of life endangerment, fetal defect or a "psychiatric condition which represents a serious and substantial threat to the life of the pregnant woman." Finally, Wisconsin allows funding in cases of life endangerment, rape, incest or severe and long-lasting physical health damage to the woman if the abortion were not performed.

Table 3. Reported public expenditures for abortions (in 000s of dollars) and number of publicly funded abortions, by funding source, according to state and state funding policy, FY 1990

State and policy	Expenditures			No. of abortions		
	Total	Federal	State	Total	Federal	State
U.S. total	65,299	119	65,180	162,583	165	162,418
NONRESTRICTIVE	65,073	15	65,058	162,221	4	162,217
Voluntary	24,874	15	24,858	61,690	4	61,686
Alaska	314	0	314	626	0	626
Hawaii	327	0	327	1,155	0	1,155
Md.	2,900*	0	2,900*	3,550*	0	3,550*
N.Y.	17,500	0	17,500	43,500	0	43,500
N.C.	439	15	424	1,925	4	1,921
Oreg.	686	0	686	2,748	0	2,748
Wash.	2,607	0	2,607	7,584	0	7,584
W. Va.	101	0	101	602	0	602
Court ordered	40,200	0	40,200	100,531	0	100,531
Calif.	31,872	0	31,872	88,153	0	88,153
Conn.	1,110	0	1,110	u	0	u
Mass.	nr	nr	nr	nr	nr	nr
N.J.	7,158	0	7,158	12,016	0	12,016
Vt.	59	0	59	362	0	362
RESTRICTIVE	226	104	122	362	161	201
Life-only	97	97	0	152	150	2
Ala.	16	16	0	5	5	0
Ariz.	u	0	u	2	0	2
Ark.	0	0	0	0	0	0
Del.	18	18	0	4	4	0
D.C.	†	†	0	1	1	0
Fla.	0	0	0	0	0	0
Ga.	u	u	0	u	u	0
Idaho	nr	nr	nr	nr	nr	nr
Ill.	1	1	0	6	6	0
Ind.	†	†	0	1	1	0
Kans.	1	1	0	4	4	0
Ky.	13	13	0	6	6	0
La.	0	0	0	0	0	0
Maine	u	u	0	3	3	0
Mich.	2	2	0	4	4	0
Miss.	0	0	0	0	0	0
Mo.	0	0	0	0	0	0
Mont.	1	1	0	1	1	0
Nebr.	u	u	0	3	3	0
Nev.	0	0	0	0	0	0
N.H.	0	0	0	0	0	0
N.M.	21	21	u	90*	90*	u
N. Dak.	0	0	0	0	0	0
Ohio	u	u	0	u	u	0
Okla.	0	0	0	0	0	0
R.I.	nr	nr	nr	nr	nr	nr
S.C.	15	15	0	10	10	0
S. Dak.	0	0	0	0	0	0
Tenn.	4	4	0	6	6	0
Tex.	4	4	0	6	6	0
Utah	0	0	0	0	0	0
Other restrictions	129	7	122	210	11	199
Colo.	1	1	0	3	3	0
Iowa	15	5	10	13	3	10
Minn.	1	1	†	6	5	1
Pa.	56	0	56	96	0	96
Va.	54	0	54	86	0	86
Wis.	3	0	3	6	0	6
Wyo.	0	0	0	0	0	0

*Estimate only.

†Indicates an expenditure is under \$500.

supreme court.¹² Proposals by the West Virginian legislature to restrict abortion funding in that state are currently before the state supreme court. In Illinois, however, supporters of abortion rights have filed a lawsuit against funding restrictions, charging that they violate the state constitution.¹³

For the past 12 years, the California legislature has attempted to cut off abortion funding but the state supreme court has enjoined that action just as regularly and ordered funding to continue. For the first time in more than a decade, however, the legislature approved a budget for FY 1991 that did not include abortion funding restrictions.

In addition to ascertaining the numbers of abortions funded and the amounts spent on them, the AGI survey asked about reimbursement rates for a first-trimester abortion performed in a clinic. Thirteen states reported rates, which ranged from a low of \$119 in Mississippi to a high of \$400 in Virginia (the only state with a rate over \$250).

Other Expenditures

Together, the states and the federal government spent nearly \$22 million on family planning outreach and education programs in 1990 (not shown). Federal support amounted to \$11 million, broken down as follows: 29 states spent \$4.3 million in Title X funds; 14 spent \$3.8 million in MCH block-grant funds; and six spent \$3.1 million through the Social Services block grant and other federal programs. Although state funds totaling \$10.5 million were spent on outreach and education, they were expended in only 16 states. California alone spent \$3.5 million of its own funds, representing 33 percent of the total state expenditures on outreach and education.*

While this article has presented data on total public expenditures for activities related to contraceptive services, the survey of Title X grantees also allows for a more complete breakdown of Title X expenditures to determine how much of these funds is spent on related medical care. As Table 4 shows, grantees reported spending \$118 million in Title X funds for patient care services. Ninety-five percent of this was credited to contraceptive services and four percent to sterilization services. Grantees reported spending \$1.4 million, or one percent of total Title X patient care expenditures, on STD, infertility and HIV services, and other medical care. However, most

*Several states and the District of Columbia reported some expenditures but were unable to provide data for the following funding sources: Title X—13 states and the District of Columbia; MCH block grant—nine states and the District of Columbia; Social Services block grant—10 states; and state funds—nine states.

legislation for the District prohibiting the use of locally raised revenues for abortion except when the pregnant woman's life is endangered.¹¹ A citizen-sponsored referendum in

Michigan resulted in the restriction of abortion funding in cases of life endangerment, as of January 1989. That law remains in effect, although it is being appealed to the state

Table 4. Reported Title X expenditures (in 000s of dollars), by grantee, according to type of patient care or related activity, FY 1990

Grantee	Total	Patient care services							Outreach and education
		Total	Contraception	Sterilization	STD	Infertility	HIV	Other medical	
U.S. total	122,085	117,746	111,831	4,558	753	424	122	58	4,339
State agency	78,486	76,780	71,455	4,447	504	334	30	10	1,706
Nonstate agency	43,599	40,966	40,376	112	249	90	92	48	2,633

of the grantees that indicated these expenditures were unable to supply precise data,* for those grantees, expenditures for STD, HIV and other medical services are included in the amount reported as contraceptive services. As a result, the reported expenditures understate the actual amount of Title X funds used for these services and overstate Title X expenditures for contraceptive services.

As discussed earlier, approximately half of the 77 Title X grantees are state health departments and half are other, various agencies. State health departments accounted for 64 percent of all Title X funds spent, however, and other grantees for 36 percent. Furthermore, state health departments ac-

counted for 64 percent of Title X expenditures on contraceptive services, 98 percent of monies spent on sterilization and 79 percent of those appropriated to infertility services. Other grantees accounted for 75 percent of reported HIV expenditures, 83 percent of expenditures reported for other patient care services, and 61 percent of total Title X expenditures on outreach and education.

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*Of the 39 grantees that reported spending some Title X funds for STD services, only seven could provide data on the amount spent. Similarly, 33 grantees reported some monies spent on HIV services, but only six could provide the expenditure data. Only a few of the grantees reporting expenditures for other medical care services were able to provide funding data. Of those grantees that could provide the data, most of the expenditures were for colposcopies, Pap smear follow-ups and coronary risk evaluations.

Determinants of Unintended Childbearing Among Ever-Married Women In the United States: 1973-1988

By Linda B. Williams

Summary

A downward trend in unwanted childbearing has reversed among large segments of the population, according to data from the 1988 National Survey of Family Growth. The proportion of births in the previous five years that were unwanted at conception fell from 14 percent in 1973 to eight percent in 1982, but increased to 10 percent in 1988. Between the 1982 and 1988 surveys, increases were most pronounced among women with less than a high school education and among women living below the federal poverty level. Differences between black women and white women in levels of unwanted childbearing, which were converging prior to 1982, have since grown considerably, particularly among the poor and the less educated.

Introduction

Fertility in the United States fell below the replacement level more than 15 years ago,¹ and some estimates have since indicated that as many as 25 percent of all U.S. women will remain childless throughout their reproductive lives.² Declining levels of unwanted fertility were observed in the United States during the 1960s, 1970s and early 1980s.³ Much of the reduction in overall fertility can be attributed directly to the widespread distribution and acceptance of the pill and other effective contraceptive methods.

By 1982, less than 10 percent of all births

"Over time, black women at higher income levels have become increasingly able to avoid an unwanted birth, but progress among women living below the poverty level (both black and white) appears to have halted."

to ever-married women were unwanted at the time of conception. Although white women continued to report fewer unwanted births than did black women, the percentage point decrease in unwanted childbearing was particularly great among the latter.⁴ The apparent convergence of blacks and whites in levels of unwanted childbearing paralleled a convergence in the use of effective methods of contraception that took place across income levels, marital statuses, and racial groups over the course of the 1970s and early 1980s.⁵

In spite of these trends, avoiding an unwanted birth has remained "a serious and difficult task."⁶ Because most couples now desire fewer children, women are spending prolonged periods of time exposed to the risk of having an unwanted birth. In fact, approximately three-quarters of all ever-married women spend at least 15 years at the end of their reproductive lives at risk of unwanted childbearing. Using 1982 data, Larry Bumpass found that the median age at last wanted birth was roughly 27 years among ever-married women; with the exception of women who married after age 25, the median age at last wanted birth was younger than 30 among all categories of women included in his study. The Bumpass findings emphasize "the pervasiveness of a long period of risk" of having an unwanted birth.⁷

While the proportion of births that are unwanted tend to increase with women's age, mistimed births are particularly prevalent among younger women.⁸ If the age at first intercourse continues to decline among women in the United States, this period of risk will continue to grow as well.⁹

The changing political climate in various

parts of the country regarding information about and access to abortion may further complicate the situation. Stanley Henshaw and Jennifer Van Vort recently noted that while the number of service providers grew steadily during the 1970s and early 1980s, it declined by 11 percent over the next few years—from 2,908 in 1982 to 2,618 in 1987 and 2,582 in 1988.¹⁰ The decrease was most pronounced among hospital providers in areas of the country where abortion services were less prevalent to begin with. In fact, the number of nonmetropolitan providers is now 51 percent below the highest number in 1977.¹¹ Declining access to abortion services is almost certain to affect levels of unwanted and mistimed births.

This article focuses on recent trends and social and demographic determinants of unintended childbearing in the United States and, in particular, on whether levels of unwanted childbearing have converged among women of different racial and ethnic backgrounds and socioeconomic statuses. As programs aimed at preventing unintended childbearing have spread throughout the United States, differences by race and ethnicity, education, and income level should have narrowed.

Data and Methods

This analysis is based on three rounds of data from the National Survey of Family Growth (NSFG), which was conducted by the National Center for Health Statistics. The data from the most recent round (Cycle IV) were collected in the first eight months of 1988 using a multistage area probability sample of women between the ages of 15 and 44. Interviews were conducted with 8,450 women

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of all marital statuses, 2,771 of whom were black, 5,354 of whom were white, and 325 of whom said they belonged to other racial groups. All belonged to the noninstitutionalized population of the United States.

Comparative data from Cycle I of the NSFG, conducted in 1973, and from Cycle III, conducted in 1982, are also analyzed. These cycles were also based on multistage area probability samples of women aged 15-44. Most never-married women were excluded from the sample in 1973,¹² so to ensure data comparability, this paper focuses only on trends among ever-married women. The estimates of the statistics discussed in this analysis are derived from samples, and are therefore subject to sampling variability.

Unintended births are births that are either unwanted or mistimed. The term "unwanted" is used to describe the mother's attitude toward the pregnancy at the time of conception, although births unwanted at conception do not necessarily become unwanted children. To limit problems of recall and rationalization that are known disadvantages of retrospective data, the data are restricted to pregnancies ending in a live birth within five years of the survey date.

Whether a birth was wanted or unwanted was determined by asking the respondent if she was using a contraceptive method at the time of conception, and what her attitude toward her pregnancy was once the pregnancy was confirmed. If a method had not been used or had been discontinued before the respondent became pregnant, she was asked, "Was the reason you (had stopped/were not) using any methods because you yourself wanted to become pregnant?" Women who answered "no" to this question were then asked, "It is sometimes difficult to recall these things but, just before that pregnancy began, would you say you probably wanted a(nother) baby at some time or probably not?" Women who said they had not used, or had discontinued using, a method prior to a pregnancy because they had wanted to become pregnant, and women who said they had probably wanted to have a baby (or another baby) at some time, were then asked, "Did you become pregnant sooner than you wanted, later than you wanted, or at about the right time?"

Pregnancies that occurred at a time when a respondent had not been using a contraceptive method because she wanted to become pregnant, or when she had discontinued contraceptive use for that reason, were classified as wanted, as were those that occurred when a respondent was using a contraceptive but still felt that she wanted (or probably wanted) to have a child, or another child, at some time. Births that were wanted but occurred sooner than the respondent would have preferred were classified as mistimed. (Those that occurred later than the respondent would have preferred are not considered mistimed, since in most cases the delay was not subject to planning or choice.) A birth was classified as unwanted if the respondent said she had not wanted (or had probably not wanted) to have a child, or another child, at the time of conception or at any point in the future.

If the respondent said that she did not know how she felt about having a child (or another child) then or in the future, or that she did not care, the status of the pregnancy was categorized as undetermined. This happened only rarely, however: Of the births that had occurred during the five years immediately preceding each survey, only 0.1 percent in Cycles I and III and 0.2 percent in Cycle IV were classified as undetermined. Therefore, wanted and unwanted births are basically complementary.

Although the series of questions on the wantedness of a pregnancy has not significantly changed over the years, the social and political climate in which the questions were asked has changed a number of times. These changes may have affected responses to this question.

In Cycle IV, interviews were conducted between January and August of 1988. Births that occurred within five years of the exact date of the woman's interview were included in this analysis. If, for example, a woman was interviewed on April 2, 1988, each birth she had had between April 2, 1983 and the interview date was counted as a "birth in the last five years." The same definition was used for the 1982 and 1973 data.

Age was classified by the age of the respondent at the time her child was born. Race was classified in Cycles III and IV ac-

cording to the respondent's description of herself as either black, white or other. In Cycle I, race was determined by the interviewer. Data from Cycles III and IV indicate that results using either method of classification are very similar. The classifications of marital status were married, widowed, divorced, separated or never-married. In the three cycles analyzed in this paper, informally married or cohabiting women were classified by their legal marital status. Women who were married but not living with their spouse were classified as separated if the reason for the separation was marital discord; otherwise, they were classified as currently married.

Economic status was determined by the poverty index ratio, calculated by dividing the total household income by the weighted average threshold income of nonfarm residents in households headed by persons under age 65.¹³ Respondents were classified into four income groups: below poverty level, between 100 and 149 percent of poverty, between 150 and 199 percent of poverty and over 200 percent of poverty. Education was measured by years of formal schooling (some high school, completion of high school, or one or more years of formal school beyond high school). Community of residence refers to residence inside or outside of a standard metropolitan statistical area (SMSA) as defined by the U. S. Census Bureau.[†]

Results

As shown in Table 1 (page 214), the proportion of recent births unwanted at the time of conception to ever-married women decreased sharply between 1973 and 1982, from more than 14 percent to less than eight percent, then rose in 1988 to more than 10 percent. During the same period, the proportion of mistimed births remained constant.

At all three times, the proportions of births that were unwanted at conception increased with age of the mother (data not shown), while births that were mistimed showed a corresponding decrease.[‡] Over time, mistimed births have consistently outnumbered unwanted births. Although mistimed births in the five years leading up to the 1973 survey were almost twice as prevalent as unwanted births, by 1982 they outnumbered

*For Cycle I, the ratio was based on poverty levels from a 1973 Census Bureau report. (See: U. S. Bureau of the Census, "Characteristics of the Low-Income Population, 1973," *Current Population Reports*, Series P-60, No. 98, 1973.) The ratio took into account the gender of the family head and the number of persons in the family. Total family income is from all sources within a respondent's family. For Cycle III, the ratio was expressed as a percent of the poverty levels from a 1982 Census report. (See: U. S. Bureau of the Census, "Money Income and Poverty Status of Families and Persons in the United States," *Cur-*

rent Population Reports, Series P-60, No. 1240, 1982.) In Cycle IV, the ratio was based on poverty levels as shown in a 1987 Census report. (See: U. S. Bureau of the Census, "Poverty in the U. S.: 1987," *Current Population Reports*, Series P-60, No. 163, 1987.)

†It is unlikely that changes in the Census Bureau's definition of an SMSA should greatly affect the results of this analysis over the period of time examined. Data for residence, educational level, and poverty status are available only as of the time of each survey—not as of the time

of each birth. In addition, the calculation of poverty status involves consideration of both income and household composition. Therefore, reverse causality cannot be ruled out and findings must be interpreted with caution. Limiting births to those occurring within five years of the survey should help minimize this problem, however, and allow for consistency across surveys.

‡The same pattern is observed across parities. Because age and parity are highly correlated, however, only age is included in the regression analyses that follow.

Table 1. Number of births (in 000s) in the previous five years to ever-married U.S. women aged 15-44 and percentages unwanted and mistimed at conception, by race and other maternal characteristics, 1973, 1982 and 1988

Characteristic	Births in previous 5 years			% unwanted			% mistimed		
	1973	1982	1988	1973	1982	1988	1973	1982	1988
All*	15,901	16,300	16,466	14.3	7.7	10.3	24.0	24.0	25.0
Education									
<12 years	4,485	3,359	2,887	20.2	12.0	19.9	24.1	25.6	26.8
12 years	7,614	6,555	6,033	13.2	7.4	10.3	24.6	24.2	27.7
>12 years	3,803	6,386	7,546	9.4	5.8	6.7	22.7	23.1	22.1
Poverty level									
<100%	2,271	2,790	2,489	26.2	11.9	20.7	25.3	31.5	34.3
100-149%	2,010	2,007	1,763	17.3	12.4	14.1	27.6	33.7	32.3
150-199%	2,403	2,291	2,173	14.1	5.5	8.3	24.8	22.1	22.9
≥200%	9,217	9,212	10,042	10.7	6.0	7.5	22.7	20.2	21.8
Residence									
In SMSA	11,215	12,170	12,356	13.8	7.2	10.0	24.6	23.6	23.3
Outside SMSA	4,685	4,130	4,110	15.3	9.3	11.4	22.5	25.4	30.0
White	13,978	14,296	13,962	12.3	6.7	8.8	23.4	23.6	25.6
Education									
<12 years	3,716	2,999	2,336	17.1	11.0	15.5	23.8	25.9	30.2
12 years	6,796	5,743	5,133	11.7	6.3	9.6	24.1	23.6	27.7
>12 years	3,466	5,554	6,493	8.2	4.9	5.8	21.5	22.4	22.3
Poverty level									
<100%	1,619	2,226	1,901	19.1	10.2	17.4	27.5	31.0	37.3
100-149%	1,637	1,699	1,417	15.5	11.2	12.4	25.1	33.3	32.4
150-199%	2,165	2,037	1,890	12.6	4.7	7.2	24.9	21.5	24.0
≥200%	8,558	8,334	8,753	10.2	5.4	6.7	21.8	20.2	22.3
Residence									
In SMSA	9,670	10,608	10,238	11.5	6.1	8.6	24.2	23.5	23.9
Outside SMSA	4,309	3,688	3,724	13.8	8.6	9.5	21.6	23.8	30.3
Black	1,724	1,598	1,472	30.5	15.9	22.9	28.9	28.1	26.2
Education									
<12 years	680	304	279	38.1	24.3	44.5	27.0	22.2	20.1
12 years	773	721	579	26.3	17.1	19.7	29.5	29.5	29.2
>12 years	271	572	614	23.2	9.8	15.9	32.2	29.5	26.0
Poverty level									
<100%	637	494	422	43.8	21.0	35.3	20.3	31.5	27.1
100-149%	326	257	223	27.6	23.0	24.0	38.1	32.0	35.7
150-199%	214	212	162	26.8	14.0	24.3	26.7	26.2	27.9
≥200%	547	634	666	18.0	9.6	14.1	34.3	24.5	22.0
Residence									
In SMSA	1,373	1,233	1,199	29.7	15.9	20.9	28.0	27.0	25.8
Outside SMSA	351	365	273	33.5	15.6	31.3	32.6	32.0	27.7

*Includes white, black and other races.

unwanted births by more than three to one. Even with the apparent recent increase in unwanted childbearing, mistimed births remain more than twice as common as unwanted births.

Previous research has suggested that growing numbers of mistimed births, especially among younger ever-married women,

might accompany shifts toward the use of barrier contraceptive methods and away from the use of more effective methods such as the pill and sterilization.¹⁴ While this explanation may have been plausible during the 1970s, the trend in the middle to late 1980s appeared to be toward the use of more effective methods, and away from the use of less effective methods such as the diaphragm and foam.^{15*}

Since Hispanic origin does not have an association with unwanted or mistimed childbearing that is clearly different from that of whites, data are shown only by race, which has a clear association. Among all ever-married women in 1973, unwanted births were

more prevalent among blacks than whites by 18 percentage points. By 1982, that difference had narrowed to nine percentage points, but by 1988 the size of the difference between the two groups had again grown, to 14 percentage points.

There are several reasons why large differences might remain between the proportions of unwanted births to white women and to black women. Black teens tend to initiate sexual activity before white teens do, and are therefore not only exposed to the risk of pregnancy at an earlier age, but generally reach their desired family size earlier. In addition, black teens are less likely to use contraception than are white teens, and their pregnancies are less likely to end in abortion.¹⁶ Although black teens are more likely to have had a family planning visit in the past year than are white teens,¹⁷ such visits among either group may occur as the result of an unintended pregnancy, rather than as an attempt to prevent one.

Despite program efforts to provide information and services to women of all education levels, education continues to be highly associated with unwanted childbearing among ever-married women of all races. At all three survey dates, increases in formal education were associated with smaller percentages of unwanted births among both white women and black women. Particularly noteworthy, however, is that the increases in unwanted childbearing that appear to have occurred between 1982 and 1988 are statistically significant only among women with less than a high school education. Moreover, although differences between blacks and whites who are high school graduates, and between those who have gone on to attend at least some college, are marginally significant at the .10 level, differences between black women and white women who have not completed high school are more pronounced (significant at the .01 level).

This has not always been the case. In 1973, differences between blacks and whites in unwanted childbearing were significant across categories of education, but by 1982 the differences between white and black respondents with more than a high school education were no longer statistically significant, and differences between those with fewer than 12 years of schooling remained significant only at the .10 level. Since 1982, however, the differences between black women and white women with the least education have again grown.

The data illustrate a similar pattern of change with regard to poverty level. While unwanted childbearing appears to have increased between 1982 and 1988 among women at all income levels, the increases have been most striking among ever-mar-

*It may be that the use of more effective contraceptive methods in the United States has risen not only because couples are now more likely to plan births, but also because many who have experienced an unintended pregnancy do not wish to do so again. This explanation is not explored in this analysis, however, given the extent to which abortions may be underreported in the NSFG.

ried women living below the poverty level: The proportion of unwanted births among women in poverty rose by almost 75 percent between the two survey dates.

In 1973, differences in unwanted childbearing by race were observed in every income category, with ever-married black women reporting a higher percentage of unwanted pregnancies than did comparable white women. By 1982, differences by race within income groups were no longer statistically significant except among women with incomes below the poverty level, and the differences that remained between black women and white women in that category were significant only at the .10 level. According to data from 1988, however, levels of unwanted childbearing among ever-married black women and white women in poverty have again diverged: The percentage among poor black women is once again more than double that observed among poor white women (35 percent and 17 percent, respectively).

The significant declines in unwanted childbearing observed between 1973 and 1982 took place both within and outside of SMSAs. Since then, while mistimed childbearing appears to have risen among white women living outside of SMSAs, unwanted childbearing appears to have increased among white women within SMSAs. Differences in levels of unintended childbearing between those living inside and those living outside of SMSAs tend not to be statistically significant, however.*

Regression analyses

Because unwanted conceptions are generally considered to be of greater concern than those that are mistimed, the remainder of the analysis focuses specifically on determinants of unwanted childbearing. Three sets of logistic regression analyses have been estimated: The first focuses on predictors of unwanted childbearing among women of all races; the second and third examine the same set of indicators among white women and black women, respectively (Table 2).

Many of the results of the regression analyses provide evidence confirming the findings discussed. For example, births to women aged 30 or older are far more likely to have been unwanted than are births to younger women, even when other variables are controlled for. This finding was not unexpected, and the coefficients are significant across categories of race at all three survey dates.

Household income of the respondent, examined as a percentage of poverty, also remains a strong predictor of unwanted childbearing when the other variables are controlled for. Again, births that were unwanted at the time of conception continue to

Table 2. Logistic regression coefficients for determinants of unwanted childbearing in the United States, by race and other maternal characteristics, 1973, 1982 and 1988

Characteristics	1973 N=5,013	1982 N=2,229	1988 N=2,307
ALL			
Age at birth†			
<20	-.720***	-.045	-.192
≥30	1.468***	1.151***	.837***
Poverty level‡			
<100%	.427***	.177	.534**
≥200%	-.258**	-.455*	-.308*
Education§			
<High school	.338***	.426*	.490**
>High school	-.396***	-.432*	-.504**
Race/ethnicity††			
Hispanic	-.402*	.251	-.068
Black	.990***	.889***	.953***
Constant	-2.182***	-2.732***	-2.433**
X²	500.07	84.69	116.85
df	8	8	8
WHITE	N=3,060	N=1,361	N=1,716
Age at birth†			
<20	-.764***	-.251	-.187
≥30	1.493***	1.292***	.820***
Poverty level‡			
<100%	.326*	.220	.610*
≥200%	-.241*	-.420	-.230
Education§			
<High school	.389**	.492*	.356
>High school	-.430**	-.446	-.589**
Hispanic††	-.397*	.229	-.030
Constant	-2.191***	-2.804***	-2.424***
X²	218.01	42.93	50.71
df	7	7	7
BLACK	N=1,953	N=868	N=591
Age at birth†			
<20	-.635***	.529*	-.151
≥30	1.297***	.485*	.874***
Poverty level‡			
<100%	.640***	.057	.337
≥200%	-.433**	-.679**	-.703**
Education§			
<High school	.210*	.345	1.025***
>High school	-.111	-.426*	-.114
Constant	-1.199***	-1.593***	-1.557***
X²	273.17	33.79	65.59
df	6	6	6

*p<.10. **p<.01. ***p<.001.

†Reference category is age 20-29.

‡Reference category is family income between 100-199% of poverty level.

§Reference category is high school graduate.

††Reference category is non-Hispanic white.

occur most often to women living at or below the poverty threshold. Although the importance of this association became evident again in 1988, it was perhaps most striking in the five years preceding Cycle I: In the 1973 data, statistically significant effects of poverty status were observed for women of all

racess, although relative differences between coefficients were especially pronounced among black women. By 1982, having a household income below the poverty level was no longer a statistically significant predictor of the likelihood of having an unwanted birth, either for white women or for black women. Now, however, that effect has reversed again. Over time, black women at higher income levels have become increasingly able to avoid an unwanted birth, but progress among women living below the poverty level (both black and white) appears to have halted.

Like the poverty status variable, data on education indicate that among women of all races, higher education continues to be inversely related to the likelihood that a woman will have an unwanted birth, even when the other variables are controlled for. Among white women interviewed in 1973 and 1982, births to those with less than a high school education were significantly more likely to have been unwanted than births to women with a high school education or more. Among white women interviewed in 1988, births to those who had completed some formal schooling beyond high school were significantly less likely to have been unwanted than births to less educated women. The effect of having less than a high school education on births to black women interviewed in 1988 is especially noteworthy: Births to black women with the fewest years of schooling are considerably more likely to have been unwanted at the time of conception than births to black women who have completed high school or more.

Race and ethnicity are known to be highly correlated with level of income and educational attainment. Although Hispanic origin does not seem to have had much of an effect on unwanted childbearing since the 1973 survey, the effect of being black has been highly significant at all three survey dates, despite controls for the other variables. Thus, there remains an independent effect of race on unwanted childbearing.

Discussion

Some of the ground that had been gained during the 1970s in improving women's ability to regulate their fertility has clearly been lost in recent years. This has been the case primarily among poor women, black women and women with relatively little educa-

(Continued on page 221)

*Once other variables are controlled for, a woman's residence inside or outside of a metropolitan area appears to be completely unrelated to unwanted childbearing across categories of race at all three survey dates; therefore, the residence variable is not included in the regression analyses.

Testing For Sexually Transmitted Diseases Among Women of Reproductive Age: United States, 1988

By William D. Mosher and Sevgi O. Aral

Summary

Approximately 13.3 million women aged 15-44—about 26 percent of all women of reproductive age who had ever had intercourse—were tested for sexually transmitted diseases (STDs) in the 12 months before the 1988 National Survey of Family Growth. Slightly over half of the women tested received the test as part of a family planning visit. Women who used clinics for family planning services were most likely to be tested—54 percent compared with 34 percent of women who used a private doctor for family planning and 16 percent of women who did not receive family planning services that year. The findings suggest that access to medical care, especially access to family planning clinics, has strong effects on a woman's chances of being screened for STDs, independent of her individual characteristics.

The most important individual characteristic affecting the chance of being tested for an STD was race: About 47 percent of black, 27 percent of Hispanic, and 23 percent of white and other women were tested in the 12 months before the survey. Among groups with high-risk behaviors, only 34 percent of sexually experienced teenagers were screened for STDs in the past year, as were only 43 percent of women with a positive STD history and 32 percent of women with 10 or more lifetime partners.

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"Why did only 43 percent of women with a positive STD history receive an STD test in the past year? And why are white women with a positive STD history 21 percentage points less likely to be tested than black women with a positive history?"

Introduction

Each year in the United States, an estimated 12 million cases of sexually transmitted diseases (STDs) occur, including four million cases of chlamydia, 1.5 million cases of gonorrhea, 0.5 million cases of genital herpes and 110,000 cases of syphilis.¹ The United States Public Health Service has made the reduction of STDs one of its major health objectives for the nation in the 1980s and 1990s,² because if left untreated, many STDs can cause serious complications, including pelvic inflammatory disease (PID), infertility, fetal and perinatal infections, complications of pregnancy, fetal loss and cervical cancer.³ Recent studies also suggest that women with STDs have an increased risk of tubal pregnancy, intrauterine growth retardation and preterm delivery.⁴ Because STDs are also more likely to be asymptomatic in women than in men, women are less likely to receive treatment and more likely to experience complications without periodic screening.

Screening is defined as testing apparently well persons (those without symptoms) to distinguish those who are actually well from those who have a disease. Detection of disease through screening helps prevent complications of STDs and permits greater control over its spread to other people. Screening is usually done at the initiative of a doctor or clinician rather than a patient and may be targeted to particular groups known to be at high risk of contracting a disease. Testing is also done, of course, on persons who have symptoms or complaints that suggest a particular illness.⁵

Ideally, all sexually active women should be screened frequently for STDs, but this approach is expensive, especially among pri-

vate patients of office-based physicians; among these patients, the prevalence of gonorrhea, for example, is only one or two percent.⁶ The Planned Parenthood Federation of America suggests that all patients at clinics in which four percent or more have been found to have gonorrhea should be screened for that disease, and that only high-risk women should be screened at clinics where rates of gonorrhea are very low.⁷

The literature on STDs identifies several groups of women with behaviors that typically put them at higher-than-average risk of infection: black women, sexually active teenagers, unmarried women, women who began having intercourse at an early age, women with multiple sexual partners and women living in central cities of large metropolitan areas where STD rates are high.⁸ Rates of syphilis and gonorrhea are both about six times as high among sexually experienced blacks as among their white counterparts.⁹ Gonorrhea is more prevalent among sexually experienced teenagers than any other age-group: Rates for sexually experienced white teenagers are twice as high as for sexually experienced white women 20-24, and among black teenagers, the rates are one and one-half times as high as for black women 20-24.¹⁰ Unmarried women, especially those with multiple sexual partners, have higher rates of gonorrhea, chlamydia, syphilis and cervical cancer than women with only one partner.¹¹

Given these data on STDs, decisions about who should be tested might be expected to reflect the characteristics of the individual patient, the STD rates of the community in which a clinic is located or both. This study attempts to answer three related questions: Consider-

ing the serious complications that untreated STDs can cause in women and infants, how common is STD testing? Are women at highest risk of STDs the most likely to be tested for them? In short, are STD testing practices in the United States targeted appropriately?

Data and Methods

The data for this analysis are from the 1988 National Survey of Family Growth (NSFG), conducted by the National Center for Health Statistics (NCHS), and based on personal interviews with 8,450 women—5,354 white, 2,771 black and 325 of other races. Women were eligible for the 1988 NSFG if they lived in households that had participated between October of 1985 and March of 1987 in the National Health Interview Survey (NHIS), an NCHS survey based on a multistage area probability sample drawn from about 150 areas in the United States.¹² Respondents also had to be aged 15–44 on March 15, 1988, the anticipated midpoint of the NSFG. The response rate for the NSFG was 79 percent—that is, 83 percent of the 96 percent who responded to the NHIS.

Black women were sampled at higher rates for the NSFG than were white women so that reliable statistics for blacks could be calculated in some detail. Hispanic women and women of other races (American Indians and Asians) were not oversampled, so there were not enough women from these groups in the sample to study their patterns of screening in the same detail as those of blacks and whites.¹³

All percentages in this article are weighted national estimates. The weight for each case in the survey represents the woman's probability of selection for the survey, which is then adjusted for nonresponse from women with similar characteristics (measured in the NHIS), and adjusted again to agree with U.S. Bureau of the Census estimates by age, race, marital status and parity. These adjustments make it possible to make reliable national estimates from the sample.¹⁴

Respondents were interviewed in their own homes by trained female interviewers. The interview covered a wide range of topics related to childbearing, including contraception, infertility, reproductive health, and use of medical services for family planning, infertility, prenatal care and delivery.

All women in the survey were asked if they had had "a test for venereal disease or VD" in the 12 months before they were interviewed. Data are based on the response to this question by the 7,619 women who had ever had intercourse.* In the 1982 NSFG, this question was limited to the 3,086 women who had had a family planning visit in the 12 months before the interview. An analysis of those data¹⁵ was therefore limited to

STD testing at family planning visits. Consequently, the data only covered about half of all STD testing; in addition, they described the population most likely to be tested. The 1982 survey also did not include information on the number of sexual partners women had had—a critical measure of their risk of contracting an STD. Variations in the questions on STD testing, as well as differences among the populations surveyed, make it difficult to determine whether differences between 1982 and 1988 in testing at family planning visits were real or were due to differences between the surveys. Therefore, trends in testing at family planning visits are not shown in this article.

The independent variables chosen for this analysis were based on the documented risk factors and markers for STDs¹⁶ and on preliminary analyses, which showed that variables such as education, religious affiliation and recent frequency of intercourse had little effect on the proportion tested for STDs in the year before the interview. Preliminary analyses were also conducted using as a denominator women who had had intercourse in the past 12 months (rather than women who had ever had intercourse, as our tables show). The results were virtually identical, and none of the patterns changed.

As shown for Tables 1 and 2, differences between proportions were tested for significance using normal deviate tests (z-tests). Standard errors and z-tests are based on the balanced half-sample replication technique, which is an accurate method for estimating sampling errors from complex sample surveys such as the NSFG.¹⁷ These estimates take into account both the sample size and the sample design upon which the weighted percentages are based, and do not assume simple random sampling.

In this article, we discuss differences between white and black women in some detail for several reasons. First, as noted earlier, STD rates for black women are at least six times as high as for white women. We would therefore expect that physicians would test black women more frequently. Second, the large number of black women in the NSFG sample allows us to do detailed analyses. Third, a previous analysis of the 1982 data¹⁸ showed that race was the most important determinant of testing. Finally, there are interactions between race and other variables: Some of the relationships found for white women do not hold for black women, so ignoring race would obscure some important patterns.

Results

An estimated 13.3 million women of reproductive age were tested for STDs in the 12-month period before the 1988 survey. Slight-

Table 1. Percent distribution of women who had had an STD test in the last 12 months, by type of visit at which the test was performed, according to selected characteristics, United States, 1988

Characteristic	Type of visit		
	Family planning	Other medical	Total
All	55	45	100
Race			
White	57	43	100
Black	51	49	100
Age			
15–19	79	21	100
20–24	77	23	100
25–29	68	32	100
30–34	41	59	100
35–39	30	70	100
40–44	10	90	100
Poverty level			
0–149%	60	40	100
≥150%	53	47	100

ly over half (55 percent) of these women were tested at family planning visits (Table 1). White women were somewhat more likely to have received their STD tests at a family planning visit (57 percent) than were black women (51 percent), but the difference was not dramatic. The proportion of those tested at a family planning visit was higher for younger women than for older women: More than 75 percent of women less than 25 years of age, and 68 percent of women 25–29, received their tests at a family planning visit, compared to only 10 percent of women 40–44. Hence the previous analysis of testing at family planning visits¹⁹ was heavily weighted toward women younger than 30.

Among all women who had ever had intercourse, blacks were twice as likely to report being tested for STDs as were whites (47 vs. 23 percent). The proportion tested was significantly higher for black women than for white women in every category of every variable shown in Table 2. In contrast, the differences for Hispanic women and those of other races were small: Hispanic women were slightly more likely to be tested than white women (27 percent), but the percentage tested among women of other races was the same

*The question was asked in three similar ways, depending on the respondent's answers to previous questions. If she had had a family planning visit in the previous 12 months, she was asked, "In the past 12 months, during a visit for family planning services, did you have a test for venereal disease or VD?" If she answered "no," she was asked, "Did you have a test for venereal disease or VD as part of a general check-up or other medical visit in the past 12 months?" If she had not had a family planning visit in the last 12 months, she was asked, "In the past 12 months, as part of a general check-up or other medical visit, did you have a test for venereal disease or VD?"

Table 2. Among women aged 15–44 who have ever had intercourse, percentage who received an STD test in the last 12 months, by race and selected characteristics

Characteristic	All	White	Black
Weighted N (000's)	51,146	41,809	6,918
All	26	23	47
Age			
15–19	34	32	46
20–24	36*	32*	55
25–29	30*	26*	51
30–34	25*	21	50
35–39	21*	18*	39*
40–44	15	12	39
Marital status			
Currently married	21**	19*	44
Formerly married	28*	25*	43*
Never married	35	30	51
Treated for PID			
Never treated	25**	22*	47
Ever treated	32	27	50
No. of lifetime partners			
One	19**	17*	39*
2–3	25**	21*	48
4–9	32	27	51
≥10	32	29	51
Family planning visits in the last 12 months			
≥1 to clinics	54**	49**	69**
≥1 to private doctors	34**	32**	53**
None	16	13	36
Contraceptive status			
Female sterilization	21	17	43
Male sterilization	14	14	†
Pill	38**	34**	61**
Condom	17	14	41
Current or recent pregnancy	48**	47**	60*
Other (includes nonusers)	23	21	41
Age at first intercourse			
<15	34	32*	43
15–17	29*	25	49
18–19	24*	22*	49
≥20	20	18	42
History of STD			
Had gonorrhea, herpes, or chlamydia	43**	39**	60*
Had none of these	25	22	46
Income/poverty level			
0–149%	35**	29**	50
≥150%	23	21	45
Residence			
Central city	33**	27*	51*
Suburb or rural	24	22	44

*Significantly different from at least the category below it at $p \leq .05$.**Significantly different from at least the category below it at $p \leq .001$.

†Too few cases to calculate percentage.

as for white women (23 percent). In addition, the numbers of women in these groups were small; the 552 Hispanic women in the sample who had ever had intercourse and the 264 women of other races were not large enough groups to subdivide by other variables and still

get statistically significant results. Thus, we discuss in detail only the differences between blacks and whites, which are much larger than the differences between Hispanics and whites or women of other races and whites.

As shown in Table 2, white teenagers and white women 20–24 are equally likely to report having been tested for STDs (32 percent each). Among whites, the percentage tested declined sharply at older ages, from 32 percent among those younger than 25 to 12 percent among those aged 40–44. Among black women, however, the pattern by age is irregular, with 46 percent being tested among those aged 15–19, 55 percent among those aged 20–24 and 51 percent among those aged 25–29. Sexually experienced black teens may be less likely to be screened than black women in their 20s, or they may have been less likely to realize that they were being tested for STDs.

An analysis by marital status shows that never-married women are most likely to report being tested (35 percent) and currently married women are least likely (21 percent). Women who have been treated for PID were more likely to have had a test for an STD (33 percent) than women who had never had PID (26 percent).

The percentage who reported having had an STD test was higher among women with four or more lifetime partners (32 percent) than among women with one partner (19 percent) or 2–3 partners (25 percent). Among black women, the percentage tested was higher among those with two or more lifetime partners (48–51 percent) than among those with one partner (39 percent). Among both white and black women, the proportion screened did not differ significantly between those with 4–9 and those with 10 or more lifetime partners.

The proportion reporting an STD test was much higher among women who had had a family planning visit at a clinic in the past 12 months (54 percent) than for those who had had a family planning visit with a private doctor (34 percent), or no visit at all (16 percent). This would suggest that clinics are more likely to screen than private doctors. The low percentage tested among women who had had no family planning visits may mean that many of them had had no medical visits at all and therefore no opportunity to be tested.

Women who were using the pill at the time of the interview (38 percent) and women who were pregnant or recently pregnant (48 percent) were substantially more likely to report being tested than others. This and the difference by family planning visits already described suggest that one of the major determinants of being screened, in addition to a woman's risk for STD and her source of medical care, is simply how often she uses medical care.

Among white women who began having intercourse before age 15, 32 percent reported being tested in the previous 12 months; this proportion dropped to 18 percent of white women who began having intercourse at age 20 or older. Among black women, however, there were no significant differences by age at first intercourse.

Forty-three percent of women who reported that they had had at least one episode of gonorrhea, genital herpes, or chlamydia—or any combination of the three—said they were tested for STDs at least once in the past year, compared with 25 percent of women with no history of these diseases. The difference was large and significant for both white women and black women. However, the proportion tested in the past year seems low, considering that these are women with a positive STD history.

Measuring income as a percentage of the federal poverty level, we found that low-income women were more likely to be screened for STDs (35 percent) than were higher-income women (23 percent). This difference was larger for white women than for black women. Both white women and black women living in central city areas were more likely to report receiving an STD test than were women living in suburban or nonmetropolitan areas.

Multivariate Analyses

We performed logistic regression analyses to determine which variables were the most important determinants of STD testing. The dependent variable was whether the woman reported receiving an STD test in the last 12 months. The results of three of these regressions are shown in Table 3. One regression was done for all women, to see the effect of race compared with other variables; separate regressions were also done for white women and black women to remove the numerous interactions between race and other independent variables. The equations were run using both weighted data (dividing the weight by the average weight) and unweighted data. The results were similar, so unweighted data are shown here.

Age at first intercourse, current use of the pill, income, age (in single years and in categories) and Hispanic origin are not shown in this table because preliminary analyses showed they had no significant effect after other variables were controlled for. The variables entered in each equation were number of partners (1–3 vs. four or more), history of any STD, race (black or other), central city residence, marital status (married or unmarried), current or recent pregnancy, and use of family planning services in the last year.

Among all women, the most important predictor of STD testing in the logistic re-

gression equation is having made one or more family planning visits in the last 12 months to a clinic, followed by race, use of a private doctor for family planning services in the last 12 months, and having a current or recent pregnancy. With the exception of race, all of these are indicators of the degree of use of medical care. After use of medical care and race, having a history of STDs, having had four or more lifetime partners, being unmarried and living in a central city also significantly increase the odds of being tested.

Among white women, with the same variables (except race) in the equation as for all races, the indicators of use of medical care are the most important predictors: use of a clinic, use of a private doctor, and current or recent pregnancy. The others include having four or more lifetime partners, marital status, and having a history of any STDs. Central city residence fell just short of significance.

Using the same variables for black women, we found that use of clinics and private doctors are again the most important predictors of STD testing. The principal difference between this equation and the one used for white women is that marital status and having a recent pregnancy do not have significant effects for black women.

Table 4 shows the probability of having an STD test in the past year, as predicted by the logistic regression equations for white and black women. The top row of the table shows a hypothetical woman with an average predicted probability of being tested: She has had 1-3 sexual partners, has no history of any STDs, is currently married, does not live in a central city area, is not currently or has not recently been pregnant, and she visited a private doctor for family planning services in the last year. If she is white, her predicted probability of being tested in the past 12 months is 23 percent, the average for white women. The right hand column, for black women, shows that if all other characteristics are the same, but the woman's race is black instead of white, her probability of being screened doubles, to 47 percent.

The rest of Table 4 shows the predicted probabilities of being tested, varying certain characteristics of these hypothetical women. If the woman is white and she has had four or more lifetime partners instead of 1-3, her probability of being tested rises to 34 percent. If she has had 1-3 partners but has had an STD in the past, her probability of being tested is 37 percent—an increase of 14 percentage points. If she has no history of any STD but is unmarried, the logistic regression predicts her chances of being tested as 29 percent. Being currently or recently pregnant raises the probability of screening by 20 percentage points, to 43 percent. Receiving family plan-

Table 3. Logistic regression coefficients (and odds ratios), by variables predicting testing for STDs, according to race.

Variable	All	White	Black
Race (black)	0.987 (2.68)**	na	na
≥4 partners	0.279 (1.32)**	0.238 (1.27)**	0.263 (1.30)*
History of STD	0.396 (1.49)**	0.364 (1.44)*	0.410 (1.51)*
Currently married	-0.206 (0.81)**	-0.312 (0.73)**	-0.066 (0.94)
Central city	0.215 (1.24)**	-0.182 (1.20)	0.273 (1.31)*
Current/recent pregnancy	0.677 (1.97)**	0.900 (2.46)**	0.309 (1.36)
Family planning from clinic	1.433 (4.19)**	1.647 (5.19)**	1.181 (3.26)**
Family planning from private doctor	0.863 (2.37)**	0.974 (2.65)**	0.767 (2.15)**
Constant	-1.848	-1.862	-0.833
X ²	1,149	517	190
df	8	7	7

*Coefficient is significant at $p \leq .05$.

**Coefficient is significant at $p \leq .001$.

Note: na=not applicable.

ning services at a clinic almost triples her chance of being tested, to 61 percent. If she had no family planning visits and was not currently or recently pregnant, she had only a 10 percent chance of being tested for STDs.

For a similar, hypothetical black woman, the probability of being tested does not vary as much by risk factor as it does for a white woman; however, visiting a clinic raises her chance of being tested as it does for her white counterpart—in this case from 47 to 74 percent, an increase of 27 percentage points. Having a history of any STD is next most likely to raise her chances of being screened, from 47 to 57 percent. Not using any family planning services reduces the chance of testing from 47 to 29 percent.

Discussion

Ideally, the dependent variable in this study—the percentage tested for STDs in a year—measures the behavior of health care providers, but it is affected by how often the women in the study made visits for medical care, by whether they attended a clinic or saw a private doctor, and by their individual characteristics, such as race, number of partners and history of an STD. The previous literature (cited at the beginning of this article) has focused on individual characteristics, since most studies were based on women attending particular clinics or doctor's offices. Thus, one contribution of this analysis has been to quantify the effects of the use of family planning services on the probability of being tested, and as we have seen, these effects are large.

The literature suggests that if screening decisions are based on individual characteristics, then those groups with the highest number of known risk factors would have the highest proportions screened. The cross-tab-

ular results confirmed these expectations, but the logistic regression results revealed that the effect of being a teenager, using the pill, having a low income, and being of young age at first intercourse were spurious, as they were the result of the frequent use of family planning clinics by unmarried women, teenagers and low-income women.²⁰

At least two factors may explain why health care providers test black women for STDs more often than they test white women. The much higher STD rates among black women and men than among whites²¹ indicate that black women's partners are more likely to be infected; if the woman tells her physician that her partner is infected, or reports symptoms suggesting the presence of an STD, a test is done. In addition, if the clinics visited by black women have high community or high clinic STD rates, then these clinics are likely to test everyone, as the Planned Parenthood Federation guidelines suggest.²² Therefore, for STD testing, black race may be an indicator for such

Table 4. Probability of having had an STD test in the last 12 months, by race, according to variable

Variable	White	Black
Baseline†	.23	.47
Baseline except:		
≥4 lifetime sexual partners	.34	.53
History of STD	.37	.57
Unmarried	.29	.48
Central city resident	.27	.54
Currently or recently pregnant	.43	.54
Family planning visit		
to a clinic in last 12 months	.61	.74
No family planning visit	.10	.29

†Woman has had 1-3 sexual partners in her lifetime, has no history of STD, is currently married, does not live in a central city of a metropolitan area, is not currently or recently pregnant, and visited a private doctor for family planning services in the last 12 months.

variables as community STD rates and provider testing policies. Research to evaluate further the appropriateness of the high rates of testing among black women would benefit from data on STD rates in the local community and on the total number of medical visits patients made in the last year, and from a more detailed knowledge of patients' medical histories.

Although previous research shows that STD rates are higher for sexually experienced teenagers than for women aged 20 and older,²³ we found that white teenagers were no more likely to be tested than women in their early 20s; black teenagers, on the other hand, were less likely to be tested than women aged 20 and older. This suggests that teenagers, especially black teenagers, are not getting STD tests proportional to their risk, or perhaps that teenagers are less likely to know that they are being tested. We also found that, although earlier studies assert that the number of lifetime or recent sexual partners is a key variable affecting STD risk, the percentage tested did not increase significantly between 4-9 and 10 or more partners; this is true even for unmarried women (data not shown). These results suggest the need for a more current measure of risk. For example, if a woman has had many partners in her life, but only one for the past several years, she may be considered at relatively low risk. But if our interest is in such complications of STDs as tubal infertility, then the number of lifetime partners may be an important measure of risk in deciding whether to test a woman for STDs.

We found that women with a positive history of STDs had much higher proportions screened among both blacks and whites. But why did only 43 percent of women with a positive STD history receive an STD test in the past year? And why are white women with a positive STD history 21 percentage points less likely to be tested than black women with a positive history? A more current measure of STD risk, as well as better measures of community STD rates, are needed to evaluate whether these levels of testing are appropriate.

Some limitations of this data source should be noted. Ideally, these data should reflect the thinking of health care providers that women with certain characteristics have an elevated risk of STDs and are therefore tested more often. However, for a woman to report that she was tested, she must have been told that an STD test was being done or have seen a bill to that effect, and she must have been willing to report in a survey that she had been tested. Thus, if many women did not know they were being tested or were unwilling to report it, our data would underestimate the extent of screening. We have shown, how-

ever, that our data are generally consistent with previous data on risk factors and markers for STDs, suggesting that the overall quality of the data is good. (A woman did not have to report whether she had any specific disease, only whether she was tested for any of them, so the question is less sensitive than a question about the diseases themselves.)

A more important limitation is that our measures of access to medical care were imperfect in two ways. First the survey did not contain a question on whether the respondent had had a medical visit for any reason in the 12 months before the survey; we do not know which women did not visit a doctor or clinic at all in the last 12 months. Second, only about half of the women who were tested had their tests done at family planning visits. The other half of women who were tested received their STD test at medical visits that were not for family planning; for them, we do not know whether that test was performed at a private doctor's office or at a clinic. This lack of data on whether the source of care was a clinic or private doctor is worth noting because black women are more likely to get their medical care at clinics than are white women.²⁴ Since clinics are more likely to screen than private doctors, some of the differences between whites and blacks may be due to the greater use of clinics by black women.

Finally, the survey question asked only whether the woman received "a test for venereal disease or VD"; we do not know which test or tests were done. The testing occurred in 1987 and 1988, so most of the tests were probably for gonorrhea, although some were for chlamydia, syphilis and other STDs. Moreover, the question did not differentiate among the several typical reasons for receiving an STD test: as part of a screening program, because the woman had signs or symptoms of an STD, or because her partner had been diagnosed with an STD. The usefulness of these data will be enhanced if future cycles of the NSFG include additional questions to determine why tests were done, or whether respondents were screened if they had not shown any evidence of infection.

These data show that testing is more common for women who receive family planning services from clinics, regardless of their individual characteristics, and suggest that improved access to family planning clinics might markedly raise levels of testing among groups in which it is low. Our data also show that screening is targeted toward black women; among both blacks and whites, it is targeted toward women with a history of STDs, and those with multiple partners. But the data raise questions about why

teenagers, women with 10 or more partners, and white women with a positive STD history are not more likely to be screened. Future evaluations of the adequacy of STD testing will be more definitive when we have better indicators of who asked for STD testing (so that screening of asymptomatic persons can be distinguished from testing of persons with symptoms or infected partners) and when we have better measures of STD rates among the patients of specific providers, and in specific communities. This information would make it possible to target high-risk women more effectively and further reduce the consequences of STDs for women, their partners and their babies.

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Unintended Childbearing . . .

(Continued from page 215)

tion. Although the national family planning program in this country was initially instituted to target women with incomes at or below the poverty level—those with the least access to private medical care—these are the women among whom unwanted childbearing has been increasing.

A recent study of women on welfare has suggested that the "economic, social, and psychological situation that [such women] find themselves in is simply not conducive to desiring more children"; almost all of the women interviewed for that study "expressed the desire to get off public assistance [and viewed having] an additional child as severely limiting the likelihood of escaping welfare dependence."¹⁸ The pregnancies that occurred among these women tended to be unplanned. The results of this analysis do not appear to contradict that report.

Charles Westoff has suggested that a wide income disparity between families "reduces social cohesiveness, and, at least in the ghettos, produces alienation from middle-class values."¹⁹ The result is frequently an increase in risk-taking behavior among those at the lower end of the socioeconomic scale. One manifestation of this behavior is unprotected intercourse and, consequently, growing numbers of unplanned conceptions. It has been argued that alienation and risk-taking among the underclass in the United States—in combination with a range of other factors, including declining parental authority, limited access to contraceptives and conflicting messages about sex—have contributed to the high pregnancy rates among young women in this country, which are much higher than those in other West-

ern societies. These are all factors to be considered if unwanted childbearing is to be reduced in the United States.²⁰

Because the data used in this analysis did not contain specific information about access to abortion providers, and because abortions continue to be notoriously underreported in the NSFG,²¹ the role that declining access to abortion services has played, and will continue to play, in unwanted childbearing cannot be assessed. However, lack of access is certain to have a greater impact upon those with fewer resources, many of whom will find the increasing distances they must travel for care prohibitively expensive. It thus appears necessary to reconsider ways of improving access to family planning services, especially for those who have recently found such services elusive.

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Condom Use with Regular and Casual Partners Among Women Attending Family Planning Clinics

By Varda Soskolne, Sevgi O. Aral, Lawrence S. Magder, Deborah S. Reed and G. Stephen Bowen

Summary

A survey of 16,632 women attending family planning clinics in Pennsylvania found that only 13 percent of the sample used condoms. Moreover, 67 percent of the women with regular partners never used condoms with those partners, and 72 percent of women who had casual partners never used them with those partners. Levels of condom use with both regular and casual partners were higher among women younger than 20, those who were nonwhite, those with multiple partners and those who reported a previous STD infection. However, women who had sex partners who used intravenous drugs were less likely to use condoms with regular or casual partners than were women who did not have drug-using partners.

Introduction

Both the number and the proportion of AIDS cases diagnosed in women have been increasing steadily: In 1989, women accounted for almost 11 percent of AIDS cases reported to the Centers for Disease Control (CDC), compared with seven percent of

The emphasis that [STD] prevention messages place on avoiding sex with multiple partners probably reinforces the feeling that one or more unprotected sexual encounters with the same man are not risky, even if the relationship is casual.

those reported before 1984.¹ The majority of women who have AIDS acquired the infection from contaminated needles used to inject intravenous drugs or from unprotected heterosexual contact with a person infected with human immunodeficiency virus (HIV), often a user of intravenous drugs.²

Apart from abstinence or a mutually faithful relationship with an uninfected partner, condom use appears to be the most effective way to prevent sexual transmission of HIV.³ Latex condoms have been shown to be effective barriers to HIV and other sexually transmitted viruses—at least in the laboratory—and epidemiologic studies have found that condom users and their partners are less likely than nonusers to have sexually transmitted infections.⁴

Among unmarried women aged 18–44 exposed to the risk of unintended pregnancy, reliance on condoms for contraceptive protection increased from 9 percent in 1982 to 16 percent in 1987.⁵ However, prevalence varies among population subgroups. In a survey conducted in 1984 among female adolescents visiting adolescent health clinics in San Francisco, 27 percent of the sample said they used condoms.⁶ At contraceptive care clinics in Pennsylvania, 21 percent of the female clients said they used them.⁷ Studies of women who use intravenous drugs have found that 3–45 percent report using condoms.⁸ Levels of use from 38 percent to 90 percent have been found among prostitutes.⁹

The validity and reliability of survey information about condom use are often questionable. In addition, respondents often are not asked to differentiate between condom use with regular partners and use with casual partners when reporting frequency and

consistency of use. In two studies that did make this distinction, 30–40 percent of female health clinic clients reported using condoms specifically with casual partners.¹⁰

This article reports the findings from a survey of women attending family planning clinics in Pennsylvania in the fall of 1987. The survey was designed to provide data on the prevalence of risk factors for HIV infection, levels of condom use, and factors associated with condom use. We were specifically interested in the effects on condom use of the number of sex partners and the type of partner (high risk or low risk; regular or casual), because such information is necessary for the planning of appropriate HIV risk-reduction programs.

Methods

Women attending Pennsylvania's 39 Planned Parenthood clinics during September and October 1987 were asked to complete an anonymous, self-administered questionnaire containing 17 items.¹¹ A staff member explained the purpose of the survey, urged clients to participate, and answered their questions. The response rate at most of the clinics was about 95 percent. (In one clinic, however, it was only 69 percent.)

The questionnaire asked for demographic information, the reason for the clinic visit, and information on current contraceptive use, drug use in the last five years and history of STD infection. Questions on sexual behavior included the number of partners during the last year; whether condoms were never, occasionally or always used with regular partners and with casual partners (as defined by the woman); and whether the woman had had a partner who used intravenous drugs

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Table 1. Number and percentage of women attending family planning clinics, by selected characteristics, Pennsylvania, 1987

Characteristic	N	%*
All	16,632	100
Age		
≤14	209	1
15-19	6,579	40
20-29	8,612	52
≥30	1,155	7
Data missing	77	†
Race		
White	14,193	85
Black	1,916	12
Other	273	2
Data missing	250	2
Marital status		
Single	13,274	80
Married	1,885	11
Other	705	4
Data missing	768	5
Years of education		
<12	4,167	25
12	5,490	33
>12	6,822	41
Data missing	153	1
Reason for visit		
Birth control	8,305	50
Checkup	4,390	26
Pregnancy test	1,687	10
Other	2,128	13
Data missing	122	1
Previous STD		
None	14,371	86
Any	1,967	12
Genital warts	616	4
Chlamydia	506	3
Gonorrhea	388	2
Other	457	3
Data missing	294	2
Has been tested for HIV		
Yes	678	4
No	15,256	92
Unknown	442	3
Data missing	256	2
Contraceptive method‡		
Pill	11,034	66
Condoms	2,086	13
Other	1,420	9
None	2,603	16
No. of partners in last year		
0	525	3
1	10,145	61
2	3,122	19
≥3	2,228	13
Data missing	612	4

*Totals may not add to 100 percent because of rounding.

†<.05 percent.

‡Women could report more than one method.

in the past five years. The specific questions on condom use were: "How often do you use condoms with your regular sexual partners?" and "How often do you use condoms with your casual sexual partners?"

In all, 16,698 women completed the questionnaire. The present analysis includes responses of 16,632 women (99.6 percent) who defined themselves as exclusively heterosexual. After tabulating the data by background characteristics, we used logistic regression analysis to determine variables predictive of condom use. For the multivariate analysis, we defined condom use with regular or casual partners as a dichotomous variable: never use (as the reference category) vs. always or occasionally use condoms. The logistic model was repeated with the data on use with casual partners, employing a narrower definition of safe sex (always use vs. occasionally or never use condoms). This yielded the same predictors with a similar magnitude of effect. Therefore, we categorized condom use with both regular and casual partners in the same way (i.e., with never use as the reference category) to allow comparisons.

Previous STD infections, number of partners during the last year and having partners who used intravenous drugs were entered into the regression models along with age, race, marital status and education. Other risk behaviors (having a bisexual, HIV-positive or hemophiliac sex partner) were not included because of the small proportions of women who reported having partners in these categories. Women who had not been sexually active during the previous year (N=525) were excluded.

Results

The great majority of the women were young, white, unmarried and educated at least at the high-school level (Table 1). Most had come to the clinics for birth control or a routine examination. Twelve percent reported a history of STD infection and four percent said that they had been tested for HIV. Most of the women reported contraceptive use, including 66 percent who used oral contraceptives and 13 percent who relied on condoms.

The distribution of risk factors in this sample has been described elsewhere.¹² The majority of the women had had one sex partner in the previous year, but 13 percent had had three or more, and two percent reported having had 10 or more. Four percent of the women reported that they had had sex partners who used intravenous drugs, but only 257 women (1.5 percent) had had sex partners with other risk factors.¹³

Among the respondents who had had sex with regular partners during the year before the survey, 10 percent had always used condoms and 67 percent had never done so with those partners; among women with casual partners during the previous year, 14 percent

Table 2. Number and percentage of sexually active women using condoms, by type of partner (N=16,020)

Frequency	Type of partner			
	Regular		Casual	
	N	%	N	%
Always	1,353	10	642	14
Sometimes	3,137	23	646	14
Never	9,162	67	3,215	72
Total	13,652	100	4,503	100

Note: There was no response or question did not apply for 2,368 women regarding use with regular partners and 11,517 women regarding use with casual partners.

had always used condoms with those partners and 72 percent had never done so (Table 2). Condom use with regular partners and condom use with casual partners were highly correlated: Among women with both regular and casual partners, 82 percent of the women who always used condoms with their regular partners also used them consistently with their casual partners, and 89 percent of the women who never used condoms with their regular partners never used them with their casual partners (data not shown).

Demographic characteristics related to condom use are shown in Table 3 (page 224). Women younger than 20 reported more frequent condom use with both regular and casual partners than did older women. Non-white women were more likely than white women to report always using condoms with casual partners (20 percent vs. 14 percent). Unmarried women reported more frequent condom use than married women. Small proportions of married women who had casual partners reported always or occasionally using condoms with those partners (six percent and four percent, respectively). The association between condom use and education was nonlinear: Women with a high school education were less likely than those with more education or those with less education to use condoms either with regular or with casual partners.

Condom use was significantly associated with a history of STD infection and with two measures of sexual behavior, although some of the differences were small (Table 3). Women who reported a previous STD infection were more likely than those who did not report such an infection to use condoms, especially with their casual partners. Women with multiple partners used condoms with their casual partners more often than did women with one partner (41 percent vs. 17 percent). Women with three or more partners and women with one partner were about equally likely to use condoms with regular partners.

Partners of men who did not use intravenous drugs reported higher levels of con-

Table 3. Percentages of women using condoms, by type of partner and frequency of use, according to selected characteristics

Characteristic	Regular			Casual		
	Always	Occasionally	Never	Always	Occasionally	Never
Age						
≤19	12	27	60**	17	16	67**
20-29	8	20	72	12	13	75
≥30	8	18	74	10	14	76
Race						
White	10	22	68**	14	14	72**
Nonwhite	10	28	62	20	14	66
Marital status						
Married	7	18	75**	6	4	90**
Not married	10	24	66	15	15	70
Years of education						
<12	12	25	63**	16	14	70**
12	8	20	72	11	12	77
>12	11	24	65	17	17	66
Previous STD						
No	10	23	67**	13	14	73**
Yes	8	27	65	19	19	62
No. of partners in last year						
1	10	23	67*	10	7	83**
2	10	23	67	19	15	66
≥3	8	25	67	16	25	59
Partner uses IV drugs						
No	10	23	67**	15	14	71*
Yes	5	16	79	10	15	75

*Significant at $p < .05$.**Significant at $p < .001$.

dom use than women who were partners of drug users (Table 3). Among women who reported having sex with a partner who used intravenous drugs, 21 percent used condoms always or occasionally with their regular partners, compared with 33 percent of women whose partners did not use intravenous drugs. Consistent or occasional condom use with casual partners was reported by 25 percent of women with a partner who used intravenous drugs and by 29 percent of women who reported no sex partners who used intravenous drugs.

The results of multivariate analyses for condom use with regular partners and condom use with casual partners were similar (Table 4). After controlling for age, race, marital status and education, we found that previous STD infection and sex partners who were not intravenous drug users were significant predictors of condom use with both regular and casual partners. Number of partners significantly predicted condom use only with casual partners. Overall, women who were older than 20, white, or married, and those with a high school education were less likely to use condoms than were women who were younger than 20, nonwhite, unmarried or educated at less than or more than the high school level. Women who did not report a previous STD infection and those with sex partners who used intra-

venous drugs were less likely to use condoms than women with an STD history or those who had not had a partner who used intravenous drugs. In addition, the level of condom use with casual partners was lower among women with one partner than among women with multiple partners.

Discussion

The prevalence of condom use by sexual partners of the women in our sample was low. However, condom use in this population was usually more prevalent among women who are considered to be at high risk: those who are nonwhite, those who are young and those who have multiple partners. Moreover, our finding that consistent condom use with casual partners was somewhat higher than that with regular partners suggests that the women surveyed were more likely to use condoms when their sexual behavior placed them at higher risk. Women who had a history of STD infection were more likely to use condoms than were women who had not had an STD, which may indicate that they had learned from their experience.

In contrast, our finding that women with partners who used intravenous drugs were less likely to use condoms suggests that these women may behave differently from other high-risk women who do not have

partners who use drugs. These women should be targeted for interventions that promote condom use.

This survey reports behaviors of a population not selected on the basis of risk for infection with HIV or other STDs. Although the sample may not represent all women in the United States or in Pennsylvania, it probably represents women attending Planned Parenthood family planning clinics in Pennsylvania, as the clinic sites were in urban, suburban and rural areas, and the response rate was high. Although use of self-administered questionnaires for data collection raises concern among some researchers, we feel that the reported behaviors were not biased by the mode of data collection, because similar results were obtained when responses to this self-administered instrument were compared with responses to face-to-face interviews in another family planning clinic in Pennsylvania.¹⁴

These data were collected after the American public was advised that abstinence, maintaining mutually faithful sexual relationships with HIV-negative partners and using condoms were "safe behavior."¹⁵ Recommendations about safe sexual behavior should take the circumstances of women's lives into consideration.¹⁶ For example, abstinence may not be feasible for many women.¹⁷ Moreover, even women who have only one regular partner cannot necessarily be sure that their partner is faithful, does not engage in high-risk behaviors and is HIV-negative. Therefore, it would seem sensible to advise women to use condoms with regular or casual partners who engage in known risk behaviors and with partners who are HIV-positive or whose infection status is unknown.

Our finding that prevalence of condom use varies according to whether the partner is regular or casual highlights an important factor: Sexual practices depend on the circumstances of the encounter and the type of partner. In sexual encounters with regular partners, women may feel more certain that their partner is uninfected and think that condom use is unnecessary. Furthermore, in some cultures, the decision to use contraceptives lies with the male partner, and women who insist on using condoms may be stigmatized or viewed negatively by their partners.¹⁸ In sexual encounters with casual partners, women may feel that insisting on condom use is more acceptable.

Condom use with casual partners was lower among women who had only one partner during the previous year than among those with multiple partners. These women may believe that one or more unprotected sexual encounters with the same

Table 4. Adjusted odds ratios (and 95 percent confidence intervals) for variables associated with condom use, by type of partner

Characteristic	Regular (N=12,565)	Casual (N=4,096)
Age		
≤19	1.00	1.00
20-29	0.57 (0.52-0.63)	0.62 (0.52-0.74)
≥30	0.54 (0.45-0.65)	0.54 (0.37-0.77)
Race		
White	1.00	1.00
Nonwhite	1.31 (1.17-1.47)	1.55 (1.25-1.91)
Marital status		
Married	1.00	1.00
Not married	1.21 (1.05-1.39)	2.56 (1.63-4.00)
Years of education		
<12	1.00	1.00
12	0.82 (0.74-0.92)	0.93 (0.76-1.12)
>12	1.25 (1.12-1.39)	1.56 (1.27-1.90)
Previous STD		
No	1.00	1.00
Yes	1.19 (1.06-1.35)	1.33 (1.08-1.63)
No. of partners in last year		
1	1.00	1.00
2	0.98 (0.89-1.08)	2.26 (1.90-2.70)
≥3	0.91 (0.81-1.02)	2.99 (2.50-3.57)
Partner uses IV drugs		
No	1.00	1.00
Yes	0.57 (0.46-0.71)	0.66 (0.49-0.90)

Note: Never used condoms=0; always or occasionally used condoms=1.

man are not risky, even if the relationship is casual. The emphasis that prevention messages place on avoidance of sex with multiple partners probably reinforces the feeling among these women that they are not at risk. Women with one partner may also be less experienced. In one study, sexually experienced women were more likely than relatively inexperienced women to change their sexual behavior to reduce risk.¹⁹ Educational campaigns should address the risks associated with occasional unprotected sexual encounters.

The overall low condom use in our sample suggests that women attending family planning clinics should be targeted for educational programs aimed at promoting condom use. The data presented here also indicate that special efforts should be directed toward women with sex partners who use intravenous drugs.²⁰ Persons who have sex with HIV-infected partners or engage in other risk behaviors need counseling on how to reduce their risk of infection. Risk reduction counselors should be careful not to suggest that having one casual partner is low-risk sexual behavior.

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Correction

In "Levels of Sexual Activity Among Adolescent Males in the United States" by Freya L. Sonenstein, Joseph H. Pleck and Leighton C. Ku [23:162], the first sentence of the second paragraph of the conclusion should read, "On average, sexually active males aged 15-19 spend half a year with no sexual partner, and only 20 percent reported having a sexual partner in each of the past 12 months."

Research Note

Efficacy of the Simultaneous Use of Condoms and Spermicides

By Philip Kestelman and James Trussell

Introduction

Although the message still has not been sufficiently emphasized, several literature reviews of contraceptive efficacy have counseled that the simultaneous use of two methods can be highly efficacious in preventing pregnancy, even when each method by itself is only moderately efficacious.¹ The usual reasoning is that if the contraceptive mechanisms for the two methods are independent, then the probability that both will fail is simply the product of the two probabilities of failure.

Thus, when spermicides, which have a first-year failure probability of 21 percent among typical users, are coupled with the condom, which has a first-year failure rate during typical use of 12 percent, the overall first-year probability of failure among typical users would be only 2.5 percent. This level of efficacy compares favorably with the first-year failure probability of three percent among typical users of oral contraceptives and of IUDs.²

The aim of this research note is to correct an error in the logic underlying such calculations, and to demonstrate that if the preventive mechanisms of two methods indeed operate independently, then using the methods simultaneously results in even higher efficacy than has previously been calculated. We also argue that although the assumption of independence is questionable during typical use, it is likely to hold during perfect use—i.e., correct use at every act of intercourse. The contraceptive efficacy of simultaneous perfect use of condoms and spermicides may well be as high as that of

the steroidal implant, which is the reversible contraceptive with the lowest failure rate. Finally, we contend that simultaneous use of condoms and spermicides guarantees a high level of protection against sexually transmitted diseases (STDs), including the human immunodeficiency virus (HIV).

The Model

One simple equation can be used to indicate the probability that a couple will experience an accidental pregnancy while using a particular contraceptive method (designated here as method *i*). We define contraceptive effectiveness (e_i)^{*} as the proportionate reduction in the unprotected risk of conception (c) per menstrual cycle produced by the use of that method. Hence, the method's ineffectiveness is expressed as $1-e_i$, and the risk of contraceptive failure per cycle (f_i) is simply the product of both risks: $f_i=c(1-e_i)$.

Because the probability of conception cannot be observed in a population of women practicing contraception, all studies of contraceptive efficacy report failure rates—summary statistics based on f_i —rather than effectiveness rates. Contraceptive effectiveness could, however, be estimated under various assumptions about the value of c . The probability of conception per cycle (also known as fecundability) depends on the biological fecundity of the man and woman and on coital frequency; when estimated from data on recognized pregnancies among women who are neither lactating nor using contraceptives and who are having intercourse regularly, fecundability also depends on the incidence of very early spontaneous abortion.

We will assume that c and e_i (and thus f_i) are constant over time; hence, for simplicity, we ignore the empirical tendency of failure rates per cycle among typical users to decline with duration (at least for coitus-dependent methods), and thus we avoid the need to rely on life-table procedures.

Under these conditions, a couple using

methods *i* and *j* simultaneously (provided, of course, that the contraceptive mechanisms operate independently) would encounter a probability of conception per cycle (f_{ij}) of $c(1-e_i)(1-e_j)$. Assuming that there are 13 menstrual cycles per year, we can express the annual probability of failure for one method (F_i) as $1-[1-c(1-e_i)]^{13}$. Since $c(1-e_i)=f_i$, the equation can be simplified to $F_i=1-(1-f_i)^{13}$. Furthermore, when f_i is small, $1-(1-f_i)^{13}$ may be expressed as $13f_i$.

In the same way, the annual probability of failure when methods *i* and *j* are used simultaneously (F_{ij}) may be written as $1-[1-c(1-e_i)(1-e_j)]^{13}$, or approximately $13f_{ij}$. It follows that a couple's annual probability of failure while using two methods simultaneously is lower than the product of the two separate annual probabilities of failure.

It has been estimated that for young women with moderately high coital frequency, c is about 0.2.³ For all sexually active women of reproductive age who have not been sterilized, it is estimated that about 85 percent would become pregnant within one year.⁴ Hence, c is about 0.14 among typical sexually active women. The annual probability of failure (F_{ij}) is approximately $F_i F_j / 13c$. Since $13c$ is about 1.8 for the typical woman, the product of the separate probabilities of failure ($F_i F_j$) overstates the combined probability (F_{ij}) by a factor of about two.

Contraceptive Failure

We can assume that the contraceptive mechanisms of condoms and spermicides operate independently during perfect use, since lack of independence during typical use

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^{*}In this article, we use the term effectiveness (or the percentage effective) in its strict technical sense as the proportionate reduction by a particular method in the risk of conception per cycle when we are discussing contraception, or in the risk of infection per act of coitus when we are discussing the prevention of sexually transmitted diseases. We use the term efficacy (or efficacious), on the other hand, in its loose sense to indicate how well a method works.

would most likely be due to imperfect use.* Thus, if the annual probability of failure during perfect use of a condom is two percent and the annual probability of failure during perfect use of a typical spermicide is four percent,† then the annual probability of failure during perfect use of condoms and spermicides would be 0.05 percent‡—lower than that achieved by perfect use of the combined pill (0.1 percent).§ Even if the annual probability of failure during perfect use for the condom and spermicides was twice as high—four percent and eight percent, respectively—the annual probability of failure during simultaneous perfect use would be only 0.2 percent, comparable to that of the combined pill.

Moreover, spermicides (such as foams or suppositories) provide lubrication during coitus; the use of any lubricant (as long as it is not oil-based¶) with a condom reduces the risk of breakage, thereby enhancing the condom's efficacy. As a result, the annual probability of failure for combined perfect use of spermicides and condoms would be even lower than the estimate based on independence of contraceptive mechanisms.

Little is known about the efficacy of the spermicides used in spermicidally lubri-

cated condoms. Our assumption is that if the lubricant were used without the condom, its efficacy would be lower than that of conventional spermicides because less is used. If the effectiveness of conventional spermicides during perfect use is 98 percent, the spermicidal lubricant's effectiveness during perfect use might be about 90 percent.§ If so, its annual probability of failure would be 17 percent (compared with four percent for conventional spermicides), while that of spermicidally lubricated condoms during perfect use would be 0.2 percent. The latter figure is comparable to the failure rate of the combined pill during perfect use. Even if the annual probability of failure during perfect use of the condom were doubled (to four percent) and the effectiveness of the spermicidal lubricant during perfect use were as low as 80 percent, the annual probability of failure during perfect use of spermicidally lubricated condoms would be only 0.8 percent.

Preventing STDs

The same calculations can be applied in analyzing the risk of STDs, including infection with HIV. The only difference is that we must switch from the natural unit for studying pregnancy—menstrual cycles—to the relevant unit for studying STD transmission—acts of intercourse. Analogously, we now define *prophylactic* (e.g., antiviral) effectiveness (e_i) as the proportionate reduction in the unprotected risk of infection (c_d) per act of coitus, effected by using a given prophylactic method i . The risk of prophylactic failure with method i per act of coitus then becomes $c_d(1-e_i)$. It follows directly, then, that when two methods are used simultaneously (again assuming that the protective mechanisms of the methods operate independently), the probability of transmission per act of intercourse is $f_{ij}=c_d(1-e_i)(1-e_j)$. Likewise, when two methods are each used in a certain number (n) of coital acts, the probability of failure is $F_{ijn}=1-[1-c_d(1-e_i)(1-e_j)]^n$.

Suppose that condoms and spermicides are both twice as likely to fail at preventing infection at each act of coitus as they are to fail at preventing conception during each menstrual cycle. In this case, perfect use of condoms would be 97.8 percent effective and perfect (separate) use of spermicides would be 95.5 percent effective at reducing the unprotected coital risk of STD transmission. Combining condoms with spermicides would then provide 99.9 percent effective in preventing STD transmission. In other words, using condoms with a separate spermicide should reduce unprotected coital infection risks one-thousandfold.

Finally, assuming that the infectivity of HIV

per act of unprotected intercourse is 0.2 percent,⁷ simultaneous perfect use of condoms and spermicides would entail an annual transmission probability of 0.02 percent, assuming that intercourse with an infected person occurs twice weekly. Stated differently, there would be one case of HIV transmission per year among 5,000 couples in which one partner was infected if the couple had intercourse twice weekly and used condoms and spermicides at each act of intercourse.

Likewise, if condoms and spermicides were three times as likely to fail at preventing viral transmission per act of intercourse as they are to fail at preventing pregnancy per cycle, then there would be one case of HIV transmission per year among 2,000 such couples. On the other hand, if combined use of condoms and spermicides were just as likely to prevent viral transmission as to prevent pregnancy, there would be one case of HIV transmission per year among 20,000 such couples. Again, the clinical message is that the simultaneous use of these two methods reduces the risk of infection substantially.

Conclusions

Models are only as reliable as their assumptions. Empirical evidence on the efficacy of condoms and spermicides used correctly and consistently at every act of intercourse would be welcomed and would eliminate one source of uncertainty in our calculations. Nonetheless, we conclude that consumers may safely place more confidence in good-quality condoms, when these are used carefully and conscientiously along with spermicides, than they may have up until now. Consistent, conscientious use of condoms along with a (separate) spermicide should guarantee contraceptive protection as efficacious as that provided by combined oral contraceptives.

Unlike hormonal methods of contraception, the combined perfect use of good-quality condoms and spermicides also provides excellent protection against STDs, including HIV. The emphasis on perfect use (i.e., correct use at every act of intercourse) should be noted; omitting precautions entails the much higher risks of conception and infection associated with unprotected coital exposure. In addition, the spermicide (or lubricant) should exhibit at least the spermicidal efficacy prescribed in the former International Planned Parenthood Federation Agreed Test for Total Spermicidal Power,⁸ and spermicides should be rubber-compatible, not oil-based.⁹

We define good-quality condoms as those that in practice resist breakage. Over the years, the consistent application of standards established by Japan, the United Kingdom and the United States has successfully min-

(Continued on page 232)

*Consider the scenario of a couple who either use spermicides and condoms together or leave both in the drawer. In this case, the assumption of independence is violated, and the combined probability of failure will exceed $1-[1-c(1-e_c)(1-e_s)]^{13}$. Whether the assumption of independence holds in practice is an empirical question; regrettably, there are no data with which to answer it.

†The probability of failure during the first year of perfect use of condoms and of spermicidal foams and suppositories has been estimated to be two percent and three percent, respectively. Failure rates for spermicidal creams and jellies are not available, but it is plausible that they would be higher than those for foam and suppositories (see reference 2).

‡As was shown earlier, $F_i=1-[1-c(1-e_i)]^{13}$. Thus, $e_i=1-[1-(1-F_i)^{1/13}]/c$. If $c=0.14$ and $F_i=0.02$ for the condom, then $e_i=0.98891$. If $F_i=0.04$ for spermicides, then $e_i=0.97761$. Hence, $F_{ij}=1-[1-c_d(1-e_i)(1-e_j)]^{13}=0.00045$, or 0.05 percent.

§It is plausible to suppose that a spermicidal lubricant used alone would be more effective than douching, which is not ordinarily considered to be a useful contraceptive method. An analysis of data from the 1970 National Fertility Survey found that the proportion of women relying on douching as a method of family planning who became pregnant within one year (standardized on their intention to delay or prevent pregnancy and their relative age) was 39 percent (see N. Ryder, "Contraceptive Failure in the United States," *Family Planning Perspectives*, 5:133, 1973). If the annual probability of failure for perfect use of douching were 30 percent (still considerably higher than that of any typical contraceptive method), then assuming an unprotected conception rate of 0.14 per cycle leads us to calculate that the effectiveness of douching would be about 80 percent. Thus, the effectiveness of a spermicidal lubricant used alone can be considered to be somewhere between 80 percent and 98 percent (the effectiveness of conventional spermicides).

A Future for Title X?

By Cory Richards

The ongoing debate over Title X, the historic centerpiece of the federal family planning effort, has been front-page news for more than a decade. From the "Squeal Rule" of the early 1980s to the "Gag Rule" of today, ideologically driven, largely antiabortion opposition to the program's integrity (and to its very existence) has remained in the spotlight. But this is certainly too narrow a view of the nature and scope of the threat to the future of subsidized family planning. As three articles in this issue of *Family Planning Perspectives* dramatically illustrate, challenges at the most basic funding and services levels—only some of them a direct result of the political controversy—are equally daunting and appear to be mounting.

In "Public Funding of Contraceptive, Sterilization and Abortion Services, Fiscal Year 1990" (p. 204), Rachel Benson Gold and Daniel Daley show how radically the purchasing power of the national family planning program has been eroded over the last decade. Using constant dollars (adjusted for inflation), they find that total public funding for contraceptive services declined by one-third between 1980 and 1990. This decrease occurred even though Medicaid expenditures for contraceptive services increased by one-quarter over the decade, largely as a result of an increase in the number of Medicaid recipients and in the cost of medical care in general during the period, as well as an increase in reimbursement rates and an improvement in reporting. In addition, state expenditures for contraceptive services increased considerably, over and above the amount required to continue to match federal funds. The major reason for the overall decline was that constant-dollar expenditures under Title X decreased by almost two-thirds between 1980 and 1990. By 1990, Title X was contributing only 22 percent of total public funding for contraceptive ser-

vices, down from 44 percent at the beginning of the decade.

Moreover, in "Family Planning Clinics: Facing Higher Costs and Sicker Patients" (p. 198), Patricia Donovan describes how family planning providers are struggling to cope not only with reduced budgets for basic contraceptive care but also with new, and inevitably more expensive, programmatic challenges. These challenges spring from a world and a clinic caseload that are vastly different from those seen in the late 1960s and early 1970s, when the national family planning program was designed and first funded.

Donovan's interviews with more than 50 family planning clinic directors and administrators from around the country bear compelling witness to today's pressures and tomorrow's challenges. Clinics now are treating markedly less healthy clients who often have no other source of medical care and need screening for a variety of conditions that are not directly related to family planning but often require expensive follow-up care. The number of patients who either have or are at risk of contracting sexually transmitted diseases (STDs) has exploded. (In "Testing for Sexually Transmitted Diseases Among Women of Reproductive Age: United States, 1988" [p. 216], William Mosher and Sevgi Aral demonstrate that 54 percent of women making a visit to a family planning clinic in 1988 were screened for STDs, compared with 34 percent of women who visited a private doctor for family planning and 16 percent of those who received no family planning services in that year.) These STDs go well beyond syphilis and gonorrhea: Infections such as chlamydia and human papillomavirus, which were little known only a few years ago, have become common, and are among the most difficult to diagnose and treat. Clinic personnel are also responding to the AIDS crisis with intensive counseling and testing, but are concerned that the real or perceived need for AIDS-related services in family planning

clinics is draining precious dollars away from both STD treatment and basic pregnancy prevention services. To these problems must be added the skyrocketing cost of Pap smears and the rising prices of oral contraceptives and other pharmaceuticals—each problem the wholly unintended but potentially ruinous result of two otherwise laudable Congressional actions.

The conclusion drawn by Donovan is stark. Clinics are being forced to charge higher fees to compensate for reductions in government support, with inevitable results: Fewer people of very low income are served; there is virtually no outreach any longer to women who are hard to serve; and while more and more ancillary services are provided, overall caseloads for core pregnancy prevention care remain largely stable or actually decline.

All of this is happening at a time of continuing, even increasing, need for basic family planning services. Gold and Daley point out that, according to data from the National Surveys of Family Growth, the number of U. S. women at risk of unintended pregnancy rose from 34 million in 1982 to 39 million in 1988. A new analysis of those landmark surveys now shows that progress in reducing unintended childbearing in this country not only slowed during the 1980s, but has been reversed. In "Determinants of Unintended Childbearing Among Ever-Married Women in the United States, 1973-1988" (p. 212), Linda Williams finds that following sharp declines between 1973 and 1982, rates of unwanted childbearing among ever-married women had increased by 1988, especially among the less educated, among the poor and among blacks. Her analysis follows a similar one, released last year, indicating that the birthrate among young teenagers—those aged 15-17—was higher in 1988 than in any year since 1977.¹ In short, increases in unintended childbearing occurred during the last decade among the very women whom the hard-hit national family planning program was designed to serve.

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The three articles discussed here raise important questions that cry out for more information and discussion. What are the real family planning needs of the 1990s and beyond, regarding both the people to be served and the services to be provided? What are the capabilities of individual programs around the nation, and the national program as a whole, to meet these needs? At the clinic level, what is the appropriate balance between the traditional provision of contraceptive services and related care and more extensive services for treating STDs (including infection with the human immunodeficiency virus) and other conditions related more broadly to reproductive health? How can we expect clinics to cope with client needs that may not be directly related to family planning, but that are the result of a client's age, income and degree of access to other components of the health care system? And how are services to be supported, organized and coordinated in the future?

Central to this discussion must be a reasoned reappraisal of the role and future importance of Title X. This program is the historic "core" of the federal family planning

effort, the one family planning program that Congress can direct and shape, the program that has set the standards for the provision of all publicly funded family planning care nationwide. However, it is also a program that has not been formally reauthorized by Congress for almost six years, and its funding level has diminished to such an extent that it now contributes less than one-quarter of all public support. How well equipped is Title X—the bright hope of two decades ago for reducing unintended pregnancy among low-income and otherwise disadvantaged women—to meet the needs and challenges of the future? Perhaps it requires only a new infusion of financial and political support to enable it to meet the goals that have thus far eluded it. Perhaps more fundamental restructuring is needed.

Sadly, whether within Congress, the administration or even the interest groups, few seem able even to think about these questions. Instead, from the program's fiercest critics to its most ardent supporters, almost all concerned seem trapped in endless and largely repetitious debate over family planning program politics, while the program's substance, needs, strengths and inevitable

weaknesses go ignored. As the three articles discussed here suggest, it is imperative that we move past this neglect and begin the work of rebuilding a subsidized family planning program in this country.

Reauthorization of Title X, which would bring at least a temporary halt to the yearly political debate over whether, on ideological grounds, family planning programs should exist or be obliterated, is a prerequisite for the kind of rethinking that will be necessary if that rebuilding is to occur. In fact, reauthorization may be little more than a prerequisite. We should not be deluded into believing that, at the program level, reauthorization (even with the modest funding increases contemplated in pending legislation) will be much more than a stopgap that will allow clinics to continue to tread water. Still, it is essential, because without it, a more substantive and reasoned debate about the needs of the future will never begin.

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State Reproductive Health Monitor: Legislative Proposals and Actions

Designed to monitor the role of the states in reproductive health-related legislation, this periodical presents an overview of state legislative developments and emerging political trends in abortion, family planning, teenage pregnancy, sex education, maternal and infant health, infertility, adoption, new reproductive technology, sexually transmitted diseases and AIDS. In addition to the overview, the report tracks every piece of reproductive health-related legislation, from introduction to defeat or enactment into law, in all 50 legislatures each year. A synopsis of every bill and a detailed index for each state make this an essential, easy-to-use reference.

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Books in Review

Differing Views of the Decline In Australian Family Size

Populate and Perish: Australian Women's Fight for Birth Control

by Stefania Siedlecky and Diana Wyndham,
Allen and Unwin, Sydney, Australia, 1990,
Aus. \$13.56, 244 pp.

Reviewed by John C. Caldwell

Australians have always been aware of the large size of their country relative to its small population, and of the fact that the majority of the world's population lives in Asia, across a stepping-stone chain of islands to their north. Australia is approximately the same size as the United States but has only one-fifteenth the population. European settlement began with British colonization in 1788, almost two centuries after British colonization of the United States had begun. At that time, Australia's indigenous population was probably around half a million, restricted in size by a hunting and gathering economy. Because much of the continent is arid, it is unlikely that it will ever be densely settled.

This background information is necessary in understanding the pun in the title of this book. For generations, Australian politicians and newspaper editors urged the country to "populate or perish," hoping to achieve growth through both high fertility and immigration. During this century, the family planning movement has turned the admonition into "populate and perish." The movement has done this partly because it pictures the individual woman or family perishing psychically, economically and even physically as a result of uncontrolled fertility, and partly because it has argued that Australia is a dry continent with only limited carrying capacity.

The beginning of agriculture in Australia dates back only to when European settle-

ment began. The ceiling on population numbers imposed by a hunting and gathering economy was lifted at that time, and, for the next 100 years, the population grew rapidly as a result of both immigration and high fertility. Few thought that either would ever be curbed. By the 1880s, Australia had the highest per capita income in the world. The decade was one of economic boom dating from the middle of the century. It was generally accepted that there were, and would continue to be, jobs for all.

Yet, marital fertility was beginning to decline—as was true in Britain, the United States and Northern Europe during the same period. The decline was clearly not a reaction to local economic conditions, but may have been a result of the dawn of the consumer society and of a recently passed national law requiring schooling for all children. It almost certainly owed a great deal to the spread of ideas—even to the syndication of newspaper and magazine articles—through the English-speaking world. The influential articles were probably not those that discussed family size but those that concentrated on the good life, the happy family, the desired home, the relations of parents and their children, the right clothes for every occasion and the situation of women.

Jessie Ackermann, an American who traveled Australia extensively in the 1870s and 1880s, wrote a book about Australian women in which she noted that the birthrate was declining. She attributed the decline to both the increasing costs of raising children—particularly expenses for education—and the decreasing child mortality rate. Whatever the mechanisms, the U.S. and Australian birthrates have been identical for most of the last 100 years, providing even better evidence for Ansley Coale's theory on the spread of family planning to the limits of linguistic borders than does the experience of Europe.

Two further introductory points should be made about Australian social history. The first is that the country had an important women's movement in the last decades of the 19th century, which probably accelerated the fertility decline. That movement did not vie in fame with American and British movements in the first quarter of the present century, when women were fighting for votes by marching down New York's Fifth Avenue or chaining themselves to London's lampposts, because the vote had been achieved in the new national parliament by 1901 and the laggard states soon fell into line.

The second point is that, historically, Australian couples have restricted fertility on their own, sometimes in consultation with private doctors. The first family planning clinic in the country opened in 1933, just as

replacement fertility was attained after half a century of decline. The organized family planning movement has been important only in recent decades, primarily for such actions as pressing government on abortion rights, reinforcing the women's movement, helping teenagers to get access to contraceptives and encouraging the Australian government to provide overseas technical aid in family planning.

The reduction of family size is the story that this book purports to tell, but the authors get much of it wrong. They give the impression that the original fertility decline was largely the work of women; undoubtedly, however, women and men were for the most part in collusion. The book's section on the early history of the fertility decline is weak, uneven and strident, and may discourage many readers. This is a pity, because the sections on more recent events such as the women's health movement, the federal government's entrance into family planning and the struggle to change the abortion law are important contributions to social history.

The problems of the book lie in its birth. It was funded by a grant made by the Bicentennial Authority—the body that organized the 200th birthday of European settlement—to the Family Planning Federation of Australia. As a result, this history of fertility control in Australia overemphasizes the role of the organized family planning movement. In addition, the two authors wrote two different manuscripts that were reduced and amalgamated by a third hand. Stefania Siedlecky probably should salvage her original manuscript and concentrate on writing a book about the institutions and struggles with which she has been connected in recent decades.

The first page of the introduction is typical of the rather sloppy demographic history presented. The authors assert that the fact that 19th century Australian women did not all have 10 children was evidence of preexisting birth control: "People used folk medicine, which included abstinence, breastfeeding, withdrawal, douches, sponges soaked in various household chemicals and oral or anal intercourse" [p. 1]. These were supposedly supplemented by abortion, infanticide and child abandonment. The argument for widespread family limitation throughout much of the 19th century ignores all the studies on natural fertility showing that late marriage and prolonged breastfeeding had restricted fertility to under eight children in noncontracepting societies and to even lower levels in most Western societies. This ceiling on family size has been true of all societies, though not necessarily true of minorities within larger societies.

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The mechanics for the steep fertility decline in the 1890s—the pivotal decade when the birthrate fell almost 30 percent—are attributed by the authors largely to the greater availability of condoms. My own estimates are that most of the methods of fertility control used in the 1890s were those of the 1880s propelled into wider use by severe economic depression, and that withdrawal, douching, abstinence and abortion were all still more widely used than condoms. Additionally, the 1890s saw an increase in the use of spermicides that equalled the rise in condom use.¹

Chapter 1 also begins with a series of demographic historical errors. We are told that from the beginning of colonial settlement, survival rates in Australia were much higher than in England. The truth is that no real comparison can be made for the late 18th century. We are then told that this high level of survival raised the proportion of children in the population from four percent to 17 percent in the first decade. In fact, an adult population had settled and was beginning to breed. We are also assured that the infant death rate was 50 percent in 18th century England and 19th century Scotland, a level that would have wiped these societies out.

Chapter 6, on the struggle to change the abortion law, is excellent. Prosecutions for abortion were actually increasing in the 1960s, especially in Victoria. Great Britain passed a liberal abortion law in 1967 and South Australia followed in 1969. Elsewhere in Australia, the strength of the Catholic vote was sufficiently powerful to frighten legislators. But abortion in the larger states was controlled by common law rather than statute, and abortion cases were thrown out of court in Victoria in 1969 and New South Wales in 1972.

By 1974, the Leichhardt Women's Health Centre in inner Sydney, which was supported by the federal government, was openly offering abortions. The most exciting part of the book is about this trailblazing clinic, where Siedlecky was the first doctor and presumably performed the first abortions. By 1979, the federal parliament had turned back an attempt to stop the national health plan from funding abortion.

The book is also good on recent attempts to ensure universal access to contraceptives. It is here that the family planning movement really did give leadership. Its earlier history had been checkered, beginning with a eugenicist society called the Racial Hygiene Association, which was set up in Sydney in 1926. This group was responsible for establishing the 1933 family planning clinic, which owed some of its success to the fact that it faced Sydney University and was still a resource for students there in my own days a dozen years later.

But, to summarize, the organized family planning movement has not yet assessed properly just where it fits into one of the great social movements of our time, the demographic transition.

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Supply and Demand Applied to Condoms

The Condom Industry in the United States
by James S. Murphy, McFarland & Company,
Jefferson, N.C., 1990, \$29.95, 176 pp.

Reviewed by Janet G. Vail

Intermediate-level microeconomics students and condom aficionados will find James S. Murphy's book a practical and informative resource. Murphy examines the historical development of the condom industry and discusses how the industry conforms to economic theories. He provides practical examples of economic models at work, as well as a basis on which to judge projections and expectations about the industry and condom demand.

Murphy is at his best when describing how the barriers to entry into condom manufacturing contribute to the market's oligopolistic structure. He examines in detail the costs of production and provides evidence that the industry's profits are derived from economies of scale and substantial barriers to entry, rather than from market power or price control.

Various economic models exist to describe the pricing of goods in markets in which there are relatively few firms. One is the kinked demand curve, used to explain why prices in oligopolistic markets tend to be inflexible. In this model, price increases result in very elastic demand, while price decreases result in inelastic demand. That is, purchases decrease when the price is raised, but purchases do not increase when the price is lowered. Since this pricing theory was developed, economists have challenged its validity. However, Murphy convincingly demonstrates how this model operates within the U.S. condom industry. Because of the retail distribution structure in the United States, manufacturers do not control retail prices. Price increases by a manufacturer are met by retailer resistance to stocking

that product, thus decreasing demand, while price decreases are matched by other condom manufacturers. In either case, prices become stable and cease to be a means to increase consumer demand for a particular brand.

What then are the nonprice means of increasing demand? Media advertising is not cost efficient for the condom industry: Because of the small size of the market, television, in particular, is an expensive medium through which to advertise condoms. In addition, such advertising has not been effective at increasing the total market. Point-of-purchase displays and retailer incentives are more practical for this industry.

Although Murphy does not discuss the international environment, it is worth noting that internationally, demand is price elastic. Social marketing program managers believe that demand is sensitive to price changes and have seen their market share increase with price decreases. This sensitivity to price in the international market highlights the sharp difference with the U.S. market, where retailers essentially control pricing.

One of the author's objectives is to facilitate the work of those trying to increase total condom use. Unfortunately, most who work in the field of family planning will find little new information related to the importance of condoms; moreover, although Murphy discusses successes and failures in attempts to raise demand for condoms, he does not address how to increase their use. He states only that it is not realistic to expect another surge in condom demand and observes that "family planning is more of an attitudinal problem than a technical or educational one" [p. 8].

Although Murphy says that the major obstacle to increasing condom use is attitudinal, he does not indicate what he believes those attitudes to be. Although attitude certainly is a critical issue, technical problems are equally important. The Planned Parenthood Federation of America estimates that two-thirds of the unplanned pregnancies in the United States are due to contraceptive failure. The condom has no shortage of technical problems: Poor fit, decreased sensation and difficulty in use are technical rather than attitudinal obstacles to condom use.

The author does point out that when condoms were first marketed, consumers received unsatisfactory products. Although condom quality has improved greatly since the 1920s, technical quality is still of great concern to consumers, many of whom exhibit

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brand loyalty that depends on confidence in the technology itself. Although the author did not have access to data on breakage, various studies report breakage rates ranging from less than one percent to 12 percent.¹

Murphy briefly discusses other contraceptives as part of the condom industry environment, and examines the U.S. contraceptive market. Since approximately 80 percent of the sales market belongs to oral contraceptives, Murphy addresses the advantages of this method compared with those of condoms. However, he fails to mention the most important advantage of the oral contraceptive and the IUD, namely a higher use-effectiveness than the condom. In general, his overview of alternative family planning methods does little to advance

the reader's understanding of the motivation for condom demand.

This slim volume contains much worthy information. The author's main points could have been even more cogently presented with the addition of professional graphics and the assistance of a judicious editor who could have eliminated peripheral topics that only divert the reader's attention. In particular, observations on capital budgeting methods, criticisms of the case study approach and general disparagement of professional managers who have not worked their way up from the condom dipping line seem misplaced in this book.

On the whole, however, this is a thoughtful analysis. As Murphy writes in the last paragraph of the book: "The condom in-

dustry has provided a good example of the value of economic industry studies and a means of illustrating a number of micro-economic principles which became evident under circumstances and in ways that are different from those generally described in textbooks of economic theory. Therefore, this study helps to broaden the understanding of economics as it relates to oligopolies in general as well as specifically to the condom industry" [p. 142]. Those readers interested in industry analysis, microeconomics or condoms will find this book well worth reading.

Reference

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Efficacy of Simultaneous Use . . .

(Continued from page 227)

imized condom leakage, but these national standards have neglected occasional condom weakness, thereby risking breakage, which can be far more catastrophic, both objectively and subjectively. A new International Condom Standard minimizes the prevalence of weak condoms by prescribing minimum air-inflation properties in sample-tested batches.¹⁰

The proportion of married women aged 15–44 who are currently using condoms is about five percent worldwide, but ranges enormously, from 1–2 percent in Africa and China to about 44 percent in Japan.¹¹ The realization that condoms with spermicides (and perhaps even spermicidally lubricated good-quality condoms) guarantee ex-

tremely efficacious contraceptive protection and STD prophylaxis should encourage wider condom use, as would simplified instructions for use¹² and improved labeling for informed choice among different brands.

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Letters From Readers

Abortion Underreporting

Shelley Lundberg and Robert D. Plotnick's article "Effects of State Welfare, Abortion and Family Planning Policies on Premarital Childbearing Among White Adolescents" [22:246] provides an important contribution to our knowledge of how state policies can influence individual behavior. Using data from the National Longitudinal Survey of Youth (NLSY), the authors test models that examine the effects of state welfare, abortion and family planning policies on the probabilities that unmarried white teens will become pregnant, give birth once pregnant and marry before giving birth. Lundberg and Plotnick are to be commended for tackling an insufficiently studied but vitally important research area, using analytic techniques appropriate to the complexity of the issues involved.

The authors' analysis of data on premarital childbearing is valuable. However, their analyses of the occurrence and outcomes of premarital pregnancy are highly suspect, because abortion is underreported in surveys such as the NLSY. Although the authors assert that their data on abortion are 90 percent complete, and that their analyses are therefore unlikely to be affected by underreporting, we provide an alternative estimate that suggests a substantially lower level of abortion reporting in the data.*

Our estimate is based on a comparison between the data presented in the Lundberg and Plotnick paper and independent national data derived from birth registration and the reports of abortion providers. An exact comparison is impossible because national data are not available to match the subset of NLSY data used in the paper. This subset was restricted to white women 14–16

years of age in 1979. Premarital pregnancies among this group were observed during the years 1979–1986, when the women were between 14 and 23 years of age. Comparing these criteria to available national data, we chose as a standard for comparison statistics on pregnancies among unmarried white women aged 15–24. We draw on birth and abortion data from 1983,¹ which is the midpoint of the period studied by Lundberg and Plotnick.

The type of statistic used to make the comparison will affect the results. One cannot compare the proportions of pregnancies ending in abortion in each data set, because inclusion of faulty data on abortion in both the numerator and denominator results in an overestimate of completeness. Comparing the ratios of premarital abortions to premarital births is preferable, because births are generally found to be adequately reported in surveys.² In the Lundberg and Plotnick data, the ratio of premarital abortions to premarital births is 1.23; in the national data for unmarried white women aged 15–24 in 1983, the ratio is 2.28. Comparing the two ratios suggests that NLSY data captures 54 percent of abortions. This estimate is somewhat higher than that found in an independent evaluation of abortion data from the NLSY and other surveys, in which NLSY abortion data were estimated to be 40 percent complete, on average.³

In addition to the level of underreporting, there is a nontrivial possibility that the underreporting is biased; that is, that the likelihood of reporting an abortion is correlated with other variables relevant to the models being tested. For example, it seems plausible to hypothesize that women living in states with conservative policies may be more likely to conceal an abortion. Unfortunately we know very little about the correlates of abortion underreporting. What evidence is available is limited to demographic

correlates and provides little reassurance that level of reporting is random.⁴

These problems create a serious dilemma for investigators. Pregnancy and abortion are pressing issues that require research. Surveys provide our best possible technique for moving beyond the data available from vital records and provider information into analytic studies that can address the processes that give rise to reproductive events.

Lundberg and Plotnick are not alone in relying on flawed pregnancy data in their analyses. An awareness of data limitations can promote caution in the interpretation of these studies. However, what is most needed is sound research on the issue of underreporting itself—not only on how to minimize it in survey research, but on the nature and extent of bias it introduces into survey data. Without such information, we can never know how well analyses based on survey data represent the true nature of the processes they model.

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*The views and opinions expressed in this letter are solely those of the authors and do not necessarily express the views of the U. S. Department of Health and Human Services.

DIGEST

Concern over AIDS Changed Sexual Behavior Among One Third of Unmarried U.S. Women

Nearly one-third of sexually experienced, unmarried American women have changed their sexual behavior in response to the threat of AIDS; the most common change is limiting their number of sexual partners to one man. Most American women, however, perceive their risk of developing AIDS to be low, with 80 percent claiming they have little or no chance of becoming infected with the human immunodeficiency virus (HIV). Although American women in general are well-informed about AIDS, misinformation about its transmission persists, especially among blacks, Hispanics and low-income women. These are some findings from AIDS-related questions incorporated into the 1988 National Survey of Family Growth (NSFG).¹

An AIDS module was added to Cycle IV of the nationally representative NSFG, conducted in 1988 among 8,450 women aged 15-44. The sample included relatively few Hispanics compared with either whites or blacks; as a result, only summary data were presented for Hispanic women. In the analysis, unmarried women consist of those who had never been married as well as those who had been separated, widowed or divorced. The AIDS-related questions covered the women's knowledge about HIV transmission, changes in sexual behavior in response to the threat of getting AIDS,* and the respondents' perception of their likelihood of contracting HIV.

*Respondents who said they had changed their sexual behavior were asked to specify which change they had made. In addition to the four actions listed in the table, respondents could also indicate that they had stopped having other types of sexual relations, had stopped having intercourse with bisexual men or had stopped having sex with male intravenous drug users. Less than two percent of the sample indicated that they had made one of these changes.

¹The researchers acknowledged that using the NSFG measure on lifetime sexual partners while gathering AIDS-related data has drawbacks: namely, that the lifetime partners were not necessarily the respondents' current partners, and there was no way of ascertaining when the women were involved with each one (i.e., before or after the AIDS epidemic started).

The interviewer presented each woman with a list of correct and incorrect statements about HIV transmission and asked whether the AIDS virus could be transmitted that way; a response of "yes", "no" or "don't know" was recorded for each item. Roughly one-fifth of American women surveyed incorrectly believed that someone could get AIDS by donating blood or by being bitten by an insect. There were strong differences in levels of misinformation according to race, current marital status and income. For example, blacks and Hispanics were more than twice as likely as whites to believe that someone can be infected by giving blood (32 percent vs. 15 percent); blacks were also more likely to think that an insect bite can transmit HIV (30 percent vs. 19 percent). Further, currently married women were less likely to be misinformed on these two items than either formerly married or never-married women; differences by marital status were statistically significant for all races.

Because married women have a generally low risk of contracting AIDS, the investigators considered only the responses of unmarried women to knowledge items regarding the most common modes of transmission and any related modification in sexual behavior. One-tenth of unmarried women did not know that HIV can be transmitted by sharing hypodermic needles; slightly lower proportions thought the virus could not be transmitted through heterosexual intercourse (seven percent) or through homosexual intercourse (six percent).

Misinformation varied greatly by race and income, and tended to be lower with relatively more lifetime sexual partners.[†] For example, among black women, 21 percent of those with one partner did not know that HIV could be transmitted through sharing hypodermic needles, compared with just 13 percent among those with 10 or more partners; comparable proportions among white women were eight percent and four percent, respectively. Blacks with one part-

ner were most likely to say HIV could not be transmitted by heterosexual intercourse (18 percent), and higher income women with 10 partners or more were least likely (four percent). The investigators observe that women with the greatest risk of contracting the virus through heterosexual intercourse—those who are unmarried and have had 10 or more partners—were also the least misinformed.

Respondents were also asked if one could become infected from a person who was infected with the HIV virus but had not developed AIDS. A surprisingly high proportion (29 percent) of unmarried women either thought the virus could not be transmitted in that way or did not know; projected to the entire U.S. female population, this finding suggests that eight million unmarried women are seriously misinformed about the risk of HIV transmission. Hispanic women were more likely to answer this question incorrectly (44 percent) than were blacks (38 percent) or whites (25 percent). Women aged 15-19 were no more likely than women aged 20-44 to be misinformed regarding any of the actual modes of HIV transmission (sharing hypodermic needles, homosexual intercourse or heterosexual intercourse).

Thirty-one percent of unmarried women said they had modified their sexual behavior since learning of AIDS, compared with just three percent of married women. Thus, the researchers concentrated on analyzing behavior change among unmarried women. There was virtually no difference by age in the proportion who changed their behavior (32 percent of 15-19-year-olds vs. 31 percent of 20-44-year-olds). Differences according to race, income and number of partners, however, were statistically significant. For example, 28 percent of white women changed their behavior in some way, compared with 41 percent of black women. In addition, lower income women were more likely to have made a change than were higher income women (37 percent vs. 28 percent).

Table 1 shows the proportions of women who made a change in their sexual behavior. For the entire sample, the most frequently mentioned behavior change was a reduction in the number of sexual partners to one man (16 percent). The researchers note a "striking" increase in the proportion modifying their behavior according to rising number of lifetime partners: One-sixth of women with one lifetime partner changed their behavior, compared with one-fourth of those with 2-4 partners, one-third of those with 5-9 partners and half of those with 10 or more. This trend was less pronounced for black women than for white women: While nearly identical proportions of whites and blacks with 10 or more partners reported a change (50-51 percent), the proportion of black women with one partner who made a change was three times that of comparable white women (34 percent vs. 11 percent).

When asked how great a chance they had of developing AIDS, two percent of the respondents said they had a strong chance; 17 percent reported having some chance, 40 percent having not much chance, and 41 percent having no chance at all. Currently married women were the most likely to feel they had no chance of developing AIDS; among unmarried women, this proportion decreased with rising number of lifetime sexual partners. For example, nearly half of women with one lifetime partner said they had no chance at all, compared with one-fifth among those with 10 or more partners. The proportions reporting they had a strong chance of contracting AIDS were consistently higher for blacks than for whites, but

Table 1. Percentage of unmarried, sexually experienced respondents who made some change in their sexual behavior since learning about HIV or AIDS, by type of change, according to characteristic

Characteristic	Made one or more changes	Restricted partners to one man	Restricted partners to men respondent knows well	Reduced frequency of intercourse	Stopped having intercourse
All women*	31.0	15.6	11.5	9.3	5.5
Non-Hispanic white	27.6	13.7	11.8	7.7	4.8
Non-Hispanic black	41.4	20.3	11.1	14.7	7.2
No. of lifetime partners					
1	16.5	4.2	1.8†	5.7	6.6
2-4	25.9	12.0	6.1	8.0	5.9
5-9	34.1	18.6	12.7	9.2	4.2
≥10	50.4	29.1	29.1	16.2	5.0
Poverty level					
<150%	37.3	18.5	12.6	13.7	5.4
≥150%	27.5	13.9	10.9	6.9	5.5

*Includes Hispanics and races other than white and black (not shown separately).

†Percentage based on a small number of women.

the percentages were small (five percent vs. two percent, respectively).

A history of STDs also significantly influenced the likelihood that a woman would alter her sexual behavior in response to the risk of AIDS: Forty-three percent of unmarried women who had had an STD did so, compared with 30 percent of women who had not had an STD. Risk perception also varied significantly with a previous infection. Forty-two percent of women who had never had an STD said they had no chance of getting AIDS, but the comparable proportion among women with an STD history was 26 percent. However, the investiga-

tors caution that other socioeconomic factors associated with STDs, and the measurement of the previous STD variable, may have affected this relationship. Since the NSFG defines STD history by a prior diagnosis, the researchers conclude that women who have seen a physician for an STD are more likely to have been counseled about AIDS, and are thus more likely to be informed and to have taken steps to avoid infection.—L. Remez

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Poor Single Mothers May Need Substantial Income Supplements to Bring Their Families Out of Poverty

Single mothers living below the poverty line face major obstacles to raising themselves out of poverty: They have substantially less education and work experience than other single mothers, so they are likely to earn, on average, over \$2 less per hour than their counterparts not living in poverty. Single mothers earning the median hourly wage still have incomes below poverty level in many states, even when benefits such as Aid to Families with Dependent Children (AFDC) and food stamps are taken into consideration. As a result, poor single mothers would need either substantially higher wages or significantly more supplementary income to bring themselves and their families out of poverty.¹

An April 1991 report prepared by the federal government's General Accounting Office presents estimates on the status and the

earnings potential of single-mother families in the United States. The report was based on data from the 1979 cohort of the National Longitudinal Survey of Youth, comprising 1,079 women who in 1966 were aged 21-28 and were single mothers.

The authors begin by comparing the education, work experience and earnings potential of women who had incomes below and above the federally designated poverty level in 1986, to determine what obstacles poor women face in bringing themselves out of poverty. Less than one-fifth of the single mothers above poverty level had not finished high school, compared with almost one-half of those living below poverty level. Additionally, three-quarters of the poor women scored below the 50th percentile on the Armed Forces Qualifying Test, and one-quarter were in the 10th percentile or lower.

Poor mothers were also likely to have substantially less work experience than mothers living above the poverty line: Women in poverty had an average of two years of work experience, compared with five years among those not in poverty. In fact, over half of the poor women had less than one year of full-time work experience, primarily because they were far more likely than other women to have had only short-term and part-time jobs.

As a result of their limited education and lack of work experience, poor mothers earned substantially less than other mothers: The average wage of single mothers living below the poverty line in 1986 was \$3.75 per hour, compared with \$6 per hour among single mothers not in poverty. The investigators also estimated that the median highest hourly wage that each woman in the

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sample could expect to earn was \$2 less among poor women than among nonpoor women (\$4.50 vs. \$6.50).

Compounding this problem is that most women with young children do not work full-time throughout the year. On average, the single mothers in the NLSY sample had worked 1,630 hours during the previous year (an average of less than 33 hours per week over 50 weeks). These women were also unlikely to have jobs in which they received paid vacation time or sick leave, so their earnings were likely to be even lower if they needed to stay home with their child in an emergency.

Child care is another problem for poor mothers. Seventy percent of the working mothers with preschool children had to pay for child care; the remaining 30 percent either had relatives who were able to care for their children or received subsidized formal care. One-fifth of the poor mothers who were not working said that the primary reason they were not looking for work was lack of child care for their preschool children.

The investigators estimated the yearly incomes of poor single mothers on the basis of three scenarios, to determine the proportion who would be able to earn enough to bring themselves above the poverty level. In the first scenario, the women would work 40 hours per week all year; in the second, they would work the same number of hours as women with similar characteristics who were not receiving AFDC; in the final scenario, they would work 30 hours per week year-round. On the basis of their estimates of net yearly incomes for the women in each of the scenarios, the researchers determined that in the first scenario approximately 55 percent of the women would not earn enough to bring themselves above poverty; in the second, 71 percent; and in the third, 80 percent.

The researchers further estimated the income gap that households in the intermediate scenario would have to overcome to escape poverty. They determined that 40 percent of those families would remain at least \$2,400 below poverty, 16 percent would be \$1,200–\$2,399 below, and 15 percent would be less than \$1,200 below the poverty line.

The authors then examined the gaps between net income and the 1989 poverty level for two hypothetical single mothers, each with two children, who work 1,750 hours per year: a worker receiving the minimum wage

(\$3.80 per hour) and one receiving the median wage (\$5.15 per hour). If the mothers were to receive no benefits at all, the woman receiving minimum wage would be \$5,039 below the poverty line, and the mother receiving the median wage would be \$2,857 below poverty.

The researchers also sought to determine to what extent the income gaps would be narrowed through the provision of AFDC and food stamps, by examining the situation in a state providing the median level of benefits. (In 14 states, even women earning the minimum wage would likely not be eligible for AFDC.) In such a state, a mother earning minimum wage would receive approximately \$850 in AFDC, narrowing the gap to about \$4,187; the median-wage worker would not be eligible for AFDC. When food stamp benefits are factored in, the income gap for the minimum-wage mother would be \$1,584, and that for the median-wage mother would be \$564. Thus, both families would remain in poverty, despite receiving all benefits available to them.

The authors argue that only with additional sources of income will most of these single mothers be able to bring their families out of poverty. One such source may be child support: Only one-third of the women received any child support payments from the children's fathers, and the median amount received was \$1,200 per year. If increased awards and enforcement of payment were to raise support to \$3,000 per year, women earning minimum wage would be near the poverty line. Subsidized child care could also be helpful for poor mothers who earn too much to be eligible for AFDC. However, subsidized child care would likely make those who do receive AFDC ineligible for those benefits. Finally, the authors point out that increases in the earned income tax credit (EITC), which is included in the 1990 Omnibus Budget Reconciliation Act, could go a long way toward improving the standard of living for single mothers: Median-wage workers in 1994 (the year EITC will be fully phased in) receiving both EITC and food stamps would have incomes bringing them above the poverty line.

The authors conclude that "even relatively large increases in earnings would not be enough to bring many disadvantaged single mothers out of poverty." They believe that "if implemented effectively, legislated expansion of income supplements and services should help reduce poverty in mother-only families, [and that] as efforts to foster self-sufficiency among single mothers expand . . . government needs to assure that these women have adequate knowledge of, and access to, sources of support."—P. Rind

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Women Sterilized Before Age 25 Are Most Likely To Regret Their Decision

Women who become sterilized when they are very young are more likely to later regret their decision than are other groups of women, according to a prospective, multicenter study of women undergoing tubal sterilization in the United States.¹ Up to five years after the operation, women sterilized at ages 20–24 were twice as likely to regret their sterilization as were women sterilized at ages 30–34 (four percent vs. two percent). The timing of the procedure also significantly influenced regret: Women sterilized after a cesarean section were twice as likely to regret having done so as were women who had an interval procedure.

In an analysis of the factors influencing sterilization regret, researchers used longitudinal data from the prospective Collaborative Review of Sterilization. The study included 7,590 women who had been interviewed about their demographic, medical and obstetric histories, both before they underwent sterilization and at one-year intervals thereafter for up to five years. (Another 454 women were excluded from the study, more than half of them because they were lost to follow-up and nearly one-fourth because they dropped out after becoming pregnant or having gynecologic surgery.) The participants had been enrolled between 1978 and 1983 at 12 centers;* the final interviews were conducted in 1988. All centers conducted interviews at one, two, three and five years following the date of sterilization, and four of them interviewed women at the fourth-year interval as well.

The researchers analyzed 26,641 individual observations collected at baseline (before the sterilization) and at any of the five annual follow-up interviews. Regret was defined as at least one negative response to the following question, which was asked at each of the annual follow-ups: "Do you still think tubal sterilization as a permanent method of birth control was a good choice for you?" Women who responded positively served as the comparison group; those who responded "don't know" or refused to answer were omitted from the analysis. The researchers carried out longitudinal regression analyses to determine how the following charac-

*The 12 centers were located in Baltimore, Buffalo, Chapel Hill, Honolulu, Sacramento and St. Louis.

teristics contributed to regret: the woman's age, parity, race, education, employment, abortion history and marital status, method of payment for the surgery, timing of the sterilization and year of follow-up.

At the time of sterilization, the majority of the women were over 30 (56 percent), white (58 percent), and married (63 percent), had at least two children (74 percent) and had received 12 or more years of schooling (80 percent). Most of the sterilizations were interval procedures (73 percent) and were paid for by private insurance (66 percent).

Overall, seven percent of the women (525 in all) regretted their decision. After controlling for all other patient-related and procedure-related characteristics, the investigators found that the woman's age at the time of her operation had the strongest effect on regret: Women sterilized before age 20 were nearly three times as likely to report regret as women sterilized at ages 30-34 (6.5 percent vs. 2.4 percent), and women sterilized at ages 20-24 were nearly twice as likely (4.3 percent vs. 2.4 percent); on the other hand, those sterilized after age 34 were only half as likely to report regret as 30-34-year-olds (1.2 percent vs. 2.4 percent). All of these relationships were statistically significant.

Women sterilized after a cesarean delivery were significantly more likely to have experienced regret than were women who had had an interval procedure (4.4 percent vs. 2.1 percent). Respondents whose surgery was paid for with public funds were also significantly more likely to have regretted being sterilized than were women whose surgery was covered by private insurance (3.7 percent vs. 2.1 percent). The risk of regret was nearly one-third higher among women who had had a postabortion sterilization than among those who had not. Finally, regret was significantly more likely to occur at the fifth follow-up than at the first (3.1 percent vs. 1.8 percent). However, regret was not significantly associated with race, marital status, education, employment or parity.

The investigators warn that the results from the Collaborative Review of Sterilization may not be representative, since the study population was drawn from academic medical institutions only. Because the study was designed to determine the characteristics of women who would benefit most from presterilization counseling, pivotal events occurring after the procedure that may induce regret—such as the loss of a child or a marital change—could not be captured. The researchers also acknowledge that the rate of regret could be higher if the women lost to follow-up or women excluded because of other surgery or medical problems were

more likely than the participants to wish they had not been sterilized.

According to the investigators, the findings of an increased risk among younger women and among those sterilized after an abortion or cesarean delivery "encourage special care in advising women with these characteristics, particularly women [under] 30 years old . . ." Further, they recommend that the increased risk of regret associated with postcesarean procedures be balanced against the benefits to the women of not having to have surgery twice.—L. Remez

Reference

1. L. S. Wilcox et al., "Risk Factors for Regret After Tubal Sterilizations: 5 Years of Follow-up in a Prospective Study," *Fertility and Sterility*, 55:927, 1991.

Depression and Anxiety Decrease After Abortion, Regardless of Method

Although about two-thirds of women have high levels of anxiety and depression immediately before obtaining an abortion, this proportion is likely to drop sharply soon after the termination, according to a study conducted at the University of Aberdeen, Scotland.¹ Such a decline in anxiety was found both among women who had a vacuum aspiration (surgical abortion) and among those who were given mifepristone and a prostaglandin (medical abortion). However, nearly all of the women who had a surgical abortion found the method to be acceptable, compared with three-quarters of those who had a medical abortion.

Ninety-one abortion patients were recruited for a study assessing levels of anxiety and depression two days before and one week and four weeks after an abortion. All the women had singleton pregnancies of less than 64 days' gestation, and all were in good health. Fifty-four women had chosen to have a medical abortion induced with mifepristone and a prostaglandin. The remaining 37 women had been assigned to have a surgical abortion. The two groups did not differ significantly in age, parity or gestation.

The scale used to assess the women's emotional state was a 13-item, multiple-choice questionnaire based on the Edinburgh Postnatal Depression Scale and adapted further in a small pilot study. Scores could range from zero to 39, with a score of over 15 considered to indicate "clinically evident feelings of anxiety and depression."

The questionnaire was administered to the women two days before they either had a surgical abortion or were given mifepristone. It was then administered again one week

and four weeks later. All of the women completed the questionnaire given prior to abortion. Of the 37 women who had a surgical abortion, 34 filled out the questionnaire at the one-week follow-up and 33 did so at the four-week follow-up. Of the 54 women who had a medical abortion, 48 completed the questionnaire after one week and 42 did so after four weeks.

The mean scores of the two groups did not differ significantly at any time. However, the mean scores for both groups were significantly lower ($p < .001$) at the one-week follow-up than before the abortion: Among women who had a medical abortion, the average score on the baseline questionnaire was 15.8, while the average score at the first follow-up was 8.1. Similarly, among women who had a surgical abortion, the mean baseline score was 17.4, while the score at first follow-up was 9.7.

The proportion of women who had scores of over 15 also fell significantly ($p < .001$) following abortion; as with the mean scores, there were no significant differences between the two groups of women. Although 61 percent of the women having a medical abortion had a score of over 15 at baseline, just 15 percent and 10 percent had scores that high at one week and four weeks following the abortion, respectively. Among the women who had a surgical abortion, the proportions with scores greater than 15 fell from 68 percent to 26 percent and six percent over the course of the three tests.

At the time of the one-week follow-up, the women were asked if they believed the method of abortion they had had would be acceptable if they needed an abortion in the future. Ninety-four percent of those who had had a surgical abortion said the method was acceptable, compared with 75 percent of the women who had had a medical abortion (significant at $p < .01$). However, of 13 women who had had a medical abortion and had previously had a surgical abortion, 10 said they preferred the medical method.

The researchers believe their findings support a widely held clinical impression "that induced abortion is not associated with an increase in psychiatric morbidity, at least in the short term." In addition, they noted, "it appears that short term psychiatric morbidity is no more frequent after medical methods of termination than after surgical termination, despite the individual woman's awareness of and participation in the abortion process." The investigators were concerned, however, that the women who underwent medical abortion were significantly more likely than those who underwent surgical abortion to consider their method unacceptable if they were to need an abortion

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in the future. They point out that "further study may make it possible to identify the characteristics of women who are more suited to medical termination, and also to introduce clinical facilities that maximize the benefits while diminishing the physical and psychological sequelae."—P. Rind

Reference

1. D. R. Urquhart and A. A. Templeton, "Psychiatric Morbidity and Acceptability Following Medical and Surgical Methods of Induced Abortion," *British Journal of Obstetrics and Gynaecology*, 98:396.

Companion During Labor Lessens Women's Need Of Obstetric Intervention

The presence of a supportive companion (known as a doula) throughout labor reduced rates of cesarean section and forceps deliveries among mothers at a Houston hospital.¹ Patients attended by a doula were also less likely than patients in control groups to receive epidural anesthesia for spontaneous vaginal deliveries, to be given oxytocin to augment labor, to have babies requiring a prolonged hospital stay or to have a fever during labor. Another group had an observer in the room who recorded events during labor but did not interact with the patients; patients in this group also experienced significantly fewer obstetric interventions than those in a third group, who were neither supported nor observed.

The study site was Jefferson Davis Hospital in Houston, Texas, which is staffed by Baylor College of Medicine. Participants were nulliparous women aged 13–34, with singleton, term, uncomplicated pregnancies and without any risk factors, such as pregnancy-induced hypertension or a history of drug or alcohol abuse. A total of 412 women participated—212 in the supported group and 200 in the observed group. In addition, 204 women who had experienced a typical delivery were asked to be part of a control group after they had given birth.

"Doula" is a Greek word for an experienced woman who assists a new mother in infant care. The doulas in this study ranged in age from 22 to 55, were fluent in Spanish and English, and had had at least one normal labor and vaginal delivery with a good outcome. They were trained in hospital protocols and received an hourly wage, at an average cost of \$200 per patient supported. The

doula stayed at a patient's bedside from admission through delivery, soothing, touching and encouraging her, and explaining what was likely to happen next. (Family members rarely spent time with patients during delivery because of the hospital's problems with crowding in the labor and delivery facilities.) The doula kept records of all interactions between patient and staff, and translated if necessary. Observed women received routine care, except that the observer recorded all events during her assigned patient's labor, without speaking to her.

Of the entire sample, 62 percent were Hispanic, 26 percent were black, 12 percent were white and one percent were Asian. Slightly more than half were single. Fifty-four percent earned less than \$8,000 yearly; 27 percent earned between \$8,000 and \$15,000; and five percent earned more than \$15,000. (An additional 16 percent did not report their incomes.) The mothers' mean age was 20. Ninety-three percent of the entire sample had received some prenatal care. The supported, observed and control groups did not differ significantly on any of these characteristics. The infants born to these women did not differ significantly in mean gestational age, birthweight, length, head circumference or sex distribution. There were no stillbirths, neonatal deaths or detectable malformations among any of the infants. Hospital staff interacted with patients an average of 21 percent of the time that patients spent in labor; this did not differ between supported and observed groups.

Epidural anesthesia was used for spontaneous vaginal deliveries in eight percent of the supported group, 23 percent of the observed group, and 55 percent of the control group. There were no significant differences among the three groups in the percentages of women receiving pudendal anesthesia for spontaneous vaginal deliveries, nor were there significant differences (regardless of the type of delivery) in the percentages who were given butorphanol tartrate for pain. Oxytocin was used to augment labor in 17 percent of women in the supported group, 23 percent of those in the observed group and 43 percent of those in the control group. When forceps or cesarean delivery were considered alone, differences in oxytocin use across delivery types were not statistically significant; however, among women delivering vaginally without forceps, oxytocin was used in 14 percent of supported deliveries, 13 percent of observed deliveries and 37 percent of control deliveries.

Mean duration of labor was 7.4 hours in the supported group, 8.4 in the observed group, and 9.4 in the control group. Among women who had spontaneous vaginal deliveries, this

time differed slightly across groups (6.1, 7.1 and 6.8 hours, respectively); duration of labor differed more by group among women who delivered vaginally without forceps (6.6, 7.3 and 8.2 hours, respectively). There were no statistically significant intergroup differences in duration of labor for unmedicated, unaugmented, unanesthetized spontaneous vaginal deliveries.

Only eight percent of supported patients had cesarean sections, compared with 13 percent of observed patients and 18 percent of control patients. Forceps deliveries were also less likely among supported patients (eight percent) than among observed (21 percent) or control patients (26 percent). Members of the control group were more likely to have had cesareans because of "failure to progress" (25 out of 37) than were either the supported patients (five out of 17) or the observed patients (10 out of 26). The three groups did not differ in the number of cesareans performed because of fetal distress or cephalopelvic disproportion.

Control patients received epidural anesthesia earlier than supported patients (six hours after admission to the hospital vs. nine hours). Women in the control group also received oxytocin earlier (4.9 hours after admission) than did supported (7.5 hours) or observed patients (6.0 hours). Timing of cesarean sections differed only between supported patients (8.9 hours after admission) and control patients (11.8 hours). Only 25 control patients had unmedicated, unaugmented, unanesthetized spontaneous vaginal deliveries, compared with 116 supported patients.

Prolonged hospital stays were less common among infants born to supported patients (22 percent) than among those born to observed patients (34 percent) or to control patients (49 percent). Infants of observed and control mothers were more likely to stay in the hospital for a sepsis evaluation (10 percent and 15 percent of those with prolonged stays, respectively) than were those of supported mothers (four percent of those with prolonged stays). Most sepsis evaluations in the observed and control groups (70–74 percent) were performed because of maternal fever, compared with one percent of evaluations in the supported group. The investigators observe that maternal fever was more common in the former two groups and throughout the sample was associated with longer labor and the use of epidural anesthesia.

Most U.S. women are accompanied during labor by their spouse or partner; however, the authors of the study report suggest that a doula might have a better effect on labor and outcome because of her personal experience and calm, objective presence. The authors surmise that by reducing

the patient's anxiety level, the presence of a doula might lessen the level of circulating catecholamines, leading to an easier labor. (They note, however, that awareness of the study might have led the staff to follow hospital protocol more closely and thereby reduce the number of obstetric interventions and increase the time spent before performing them.) They conclude that in addition to the potential financial savings, "the physical and emotional benefits of doula support for the welfare of mothers and infants make a compelling case for the review of current obstetric practices." — R. Turner

Reference

1. J. Kennell et al., "Continuous Emotional Support During Labor in a U.S. Hospital: A Randomized Controlled Trial," *Journal of the American Medical Association*, 265:2197, 1991.

Exposure to Pregnancy Reduces Women's Risk Of Endometrial Cancer

Women who have had at least one birth are 30 percent less likely to develop endometrial cancer than those who have not, according to a study of women in Milan, Italy.¹ The relative risk of the disease did not decline with increasing numbers of lifetime births, but it was reduced among women with a relatively greater number of spontaneous or induced abortions. No association was found between endometrial cancer and a woman's age at the time of her first birth; however, the older a woman was at her last birth, the lower was her relative risk of endometrial cancer. The associations tended to be stronger among younger or premenopausal women. These findings suggest a short-term protective effect of pregnancy, and imply that factors such as nulliparity and premenopausal status may promote the growth of already established cancer cells, rather than initiate their development.

The study group consisted of 568 women aged 28–74 (median age of 61) admitted to a group of hospitals in the greater Milan area between 1983 and 1988. All had confirmed cases of endometrial cancer that had been diagnosed within the previous year. The control group consisted of 1,925 women aged 25–74 (median age of 54) who had been admitted to hospitals in comparable areas for treatment of acute, nonmalignant conditions that were not hormonal or gynecologic in nature and were unrelated to any of the usual risk factors for endometrial cancer. Thirty-two percent of controls had traumatic conditions (mostly fractures and sprains); 25 percent had nontraumatic orthopedic dis-

orders; 15 percent had conditions requiring surgery (mostly abdominal conditions, such as appendicitis or hernia); 18 percent had other illnesses, such as ear, nose and throat or teeth disorders; and 10 percent had other medical problems. When determining relative risks, the researchers controlled for age, education, marital status, menopausal status, body mass index, use of estrogen replacement therapy, hypertension, diabetes, parity, number of induced and spontaneous abortions, and age at first and last birth.

Seventy-five percent of women in the study group had had less than seven years of education, compared with 60 percent in the control group; 29 percent of study group women were overweight, compared with 10 percent of control group women; and 14 percent of study group women used estrogen replacement, compared with three percent of control group women. The researchers suggest that since control women were consistently younger than study women, age differences might explain in part the differences between the groups.

Women who had had at least one birth were 30 percent less likely to have developed endometrial cancer than were nulliparous women (a relative risk of 0.7, with borderline statistical significance). However, there was no decline in risk observed with increasing numbers of births: Compared with nulliparous women, those who had had one child had a relative risk of 0.8, while those who had had two children had a relative risk of 0.9; and those with three or more children had a risk of 0.9.

Relative risk decreased, however, with increasing numbers of spontaneous or induced abortions: Compared with women who had had no abortions, women who had experienced two or more spontaneous abortions were 40 percent less likely to have had endometrial cancer (a relative risk of 0.6), and women who had had two or more induced abortions had a relative risk of 0.3.

When the analysis was restricted to women who had had at least one birth, there was no significant association between risk of endometrial cancer and the women's age at the time of first birth. However, the relative risk decreased among women who were older at the time of their last birth: Compared with women whose last birth occurred before age 25, the relative risks were 0.7 for women aged 25–29, 0.6 for women aged 30–34, and 0.5 for women aged 35 and older.

The protective effects of pregnancy appeared to be greater among premenopausal women. The relative risk among women with at least one birth was 0.3 before menopause, compared with 0.8 after. The relative risk of

the disease among women whose last birth had occurred when they were aged 35 or older was 0.3 before menopause and 0.6 after. The inverse relationship between spontaneous abortion and endometrial cancer was also stronger among premenopausal women: Those who had experienced two or more miscarriages had a relative risk of 0.3 before menopause and 0.5 after.

In general, associations between reproductive factors and endometrial cancer tended to be stronger among younger women, and to plateau among older women. Among women aged 49 or younger, those who had had their first birth at ages 25–29 had a risk of endometrial cancer of 0.6, compared with women who had had their first birth when they were aged 24 or younger, and those who had had their first birth when they were older than 30 had a relative risk of 0.4. This effect was not seen among women aged 50–59, or among those 60 or older, however. Similarly, the risk of endometrial cancer appeared to decrease as age at last birth increased, but this association leveled off in the older age-groups: Among women aged 49 or younger, the risk of endometrial cancer relative to that among women under age 25 at their last birth was 0.3 for women who were 25 or older at the time of their last birth, but among women aged 50–59, the relative risk was 0.6 for women 25–29 at their last birth, 0.5 for women 30–34 at their last birth and 0.3 for women older than 35 at their last birth. The risk of endometrial cancer among women with at least one birth relative to those with none was 0.3 among women 49 or younger, 0.6 among women 50–59 and 0.8 among women 60 and older.

The higher relative risk of endometrial cancer among nulliparous women might be explained by the fact that pregnancy reduces the length of time that the endometrium is exposed to unopposed estrogens. However, the researchers found that parity appeared to be protective only in the case of the first term pregnancy and not in subsequent ones; therefore, they suggest that infertility, not necessarily low parity, is associated with endometrial cancer. The decrease in relative risk among women with higher numbers of spontaneous and induced abortions could be related to the protective effect of even a short period of pregnancy. The finding that a later age at first birth decreases the relative risk of endometrial cancer among women within the first or second decade after pregnancy leads the researchers to propose that certain reproductive factors may affect cancerous growth after the disease has already set in. They also note that "the biologic mechanisms for the action of these repro-

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ductive factors [are] probably mediated through changed hormonal balances," which may also explain the leveling off of the factors' effects among older age-groups.—R. Turner

Reference

1. F. Parazzini et al., "Reproductive Factors and Risk of Endometrial Cancer," *American Journal of Obstetrics and Gynecology*, 164:522, 1991.

Teenage Abortions Fell After Minnesota Imposed Parental Notification Law

Abortion rates among minor adolescents in Minnesota declined substantially in the years after implementation of a law requiring parental notification prior to a minor's abortion.¹ However, young teen-agers who had abortions were more likely to obtain late abortions over the four years after the law was implemented than in the three years before. The investigators hypothesize that the law may have increased some adolescents' motivation to avoid pregnancy, but allow that other factors might also have contributed to the decline.

Minnesota's parental notification law requires that both parents of a minor seeking an abortion be notified at least 48 hours before the abortion. Enacted in August 1981, it was enjoined in 1986, but the injunction was lifted in 1990 after the Supreme Court's decision in *Hodgson v. Minnesota*.² A group of researchers sought to determine the impact of the law on abortion rates and birthrates in Minnesota. They obtained data on abortions and live births among Minnesota residents from the Minnesota Center for Health Statistics, and then used these data to calculate abortion rates (number of abortions per 1,000 women), the ratio of abortions to births and the ratio of late abortions (those performed after 12 weeks) to early abortions (those performed at 12 or fewer weeks).

The rates and ratios were analyzed using a linear regression model, according to age, year of abortion or birth, and age-year interaction. The model compared rates and ratios in the various age categories to determine if the changes that occurred between the three years prior to the law's enactment (1978–1980) and the four years after enactment (1982–1985) differed significantly, particularly by age-group.

Annual data show that the abortion rate

for 15–17-year-olds climbed from 18.3 abortions per 1,000 women in 1978 to 19.6 per 1,000 in 1980, fell to a low of 12.8 per 1,000 in 1983, and then rose slowly to 14.5 per 1,000 by 1985. The abortion rate for 18–19-year-olds also rose between 1978 and 1980 (from 35.7 abortions per 1,000 to 40.3 per 1,000), then gradually dropped to 34.1 per 1,000 in 1985. Among women 20 and older, the rate rose from 12.4 abortions per 1,000 women in 1978 to 14.1 per 1,000 in 1980 and remained at around the same level thereafter.

The regression results indicate that abortion rates among 15–17-year-olds declined by a statistically significant amount between the pre-enactment and post-enactment periods; there was a smaller decline among 18–19-year-olds. In contrast, there was a statistically significant increase in rates among older women between the two periods, although the size of the increase was small.

The state data reveal a slight decline in birthrates among 15–17-year-olds in Minnesota between 1978 and 1985, from 17.8 births per 1,000 women to 15.0 per 1,000. Over the period 1978–1979, birthrates among 18–19-year-olds were at about 56–57 births per 1,000; they rose to about 59 per 1,000 in 1980 and 1981, and then began a slow decline to their 1985 level of 47.2 births per 1,000 women. Among 20–44-year-olds, birthrates varied little, ranging only from 75.2 per 1,000 to 79.8 per 1,000.

According to a regression analysis, birthrates were significantly lower at all ages after enactment of the notification law than they had been before, although the decline was more pronounced among teenagers than among older women. Further analysis showed the degree of change over time to be similar for 15–17-year-olds and 18–19-year-olds, but less for 20–44-year-olds.

After examining the ratio of abortions to births in the three age-groups, the researchers found that the ratio among 15–17-year-olds rose from 1.03 abortions per birth in 1978 to 1.12 in 1980, fell to 0.88 in 1983 and rose to 0.97 by 1985. No decline could be seen among 18–19-year-olds or among 20–44-year-olds. The regression analysis indicated a significant decrease in the abortion ratio among 15–17-year-olds between the years preceding and following enactment of the notification law, but showed no significant change among 18–19-year-olds.

As for the timing of abortion, both early abortion and late abortion rates declined significantly among 15–17-year-olds in the post-enactment period, although the fall in the early abortion rate appeared somewhat greater. This finding was borne out in the ratio of late abortions to early abortions, which was significantly greater after the no-

tification law was enacted than it had been before enactment, although the difference was larger among 15–17-year-olds than among older women. This increase was largely attributable to a decline in the number of early abortions, the authors observe, rather than an increase in late abortions.

The study findings "are compatible with the hypothesis that, initially, parental notification facilitated pregnancy avoidance in 15–17-year-old Minnesota women," the investigators note, perhaps by increasing their willingness to "take measures to avoid pregnancy." They add that other explanations are possible, however, such as heightened concern over sexually transmitted diseases in the early 1980s or increased availability of contraceptive services. (Previous research has shown that public funds used for family planning services in Minnesota rose by 20 percent between 1980 and 1981.³) The authors observe that while past studies on the impact of notification laws showed that minors often traveled to other states for abortions instead of notifying their parents,⁴ an earlier study of the Minnesota law's effects indicated that probably not many Minnesota teenagers had done so.⁵

They also point out several possible explanations of the increase in the late abortion ratio: The young women who would have had early abortions might have been more successful at avoiding pregnancy than the others; alternatively, the notification law could have caused a proportion of young teenagers to obtain abortions later than they would have otherwise. The authors add, however, that because of the overall decline in the abortion rate, a smaller absolute number of young teenagers had late abortions after enactment than before enactment.

The investigators conclude by observing that it may not be possible to generalize their hypothesis to other states, particularly given Minnesota's small minority population and overall low pregnancy rates. Further research will be needed, they observe, before the hypothesis can be sustained.—M. Klitsch

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